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Monthly Message

In November 1956 a two-day meeting of the Joint Committee on Aviation Pathology was held with an attendance of over 100 military and civilian scientists, engineers, and pathologists from the United States, the United Kingdom, and Canada.

In a study of almost 300 gross autopsy reports it was demonstrated that fatal head injuries incurred in accidents during landing and takeoff procedures were often the only significant pathologic changes noted. This emphasizes a pathway of further study along preventive lines.

Study of the degree and location of burns is often most helpful to engineers and materiel experts in arriving as to where the fire originated, its intensity and duration.

A study of pathologic findings of 14 cases of death due to inflight decompression sickness demonstrated the need for further experimental work in this direction. Other developments centered about: (1) the possibility of use of ultraviolet fluorescence and a potential role of infrared in the use of the electron microscope; (2) studies in explosive decompression at high altitudes; (3) attempts to devise a test on post-mortem tissues to show the existence of ante-mortem hypoxia; (4) problems concerned with toxicology: carbon dioxide, fuels, et cetera; and (5) hyperventilation and hypoglycemia and pre-existing disease.

These are some of the paths in research which come within the purview of this Committee in its important contribution to the prevention of airplane accidents.

Frank B. Berry

FRANK B. BERRY
Assistant Secretary of Defense
(Health and Medical)

Table of Contents

Treatment of Pneumomediastinum With Increased Air Pressure—*John H. Schulte* 469

Serious Heart Disease Simulated by Hiatus Hernia—*Eddy D. Palmer* 477

Biliary Radiomanometry—*Max L. Smith and Manuel Santos* 481

Treatment of Anticholinesterase Poisoning by Phosphate Insecticides and "Nerve Gas"—*Stephen Krop and Ted A. Loomis* 495

Personal Identification by Means of the Teeth—*Robert D. Wyckoff* 500

Enuresis and Spina Bifida Occulta—*Shelton P. Sanford and Gilbert W. Kliman* 507

Modified Marsupialization Operation for Pilonidal Sinus: An Ambulatory Treatment Using Lidocaine as a Local Anesthesia—*Daniel J. Abramson* 513

Cavity Preparation by Ultrasonic Versus Rotary Instrumentation: In Vitro Cutting Effectiveness and Heat Production—*Jack L. Hartley* 519

Reactions to Prophylactically Administered Penicillin: A Study of Sixty-Eight Hospitalized Patients—*Kenneth H. Burdick* 528

The Isolation of Enteric Pathogens at Barrow, Alaska—*Jack W. Cullison and Thomas R. A. Davis* 534

Improving Predictability of Minnesota Multiphasic Personality Inventory—*Gerald J. Briskin and James W. Stennis* 539

CLINICOPATHOLOGIC CONFERENCE

U. S. Naval Hospital, Philadelphia, Pa. 544

SERVICE ARTICLE

Psychiatric Problems in U. S. Army Installations in Europe—*Howard P. Rome* 554

CASE REPORTS

Dubin-Johnson Syndrome—*Arthur L. Klatsky and Richard F. Huck* 562

Constitutional Hepatic Dysfunction—*Nicholas H. Zeller and Gerd Schleef* 568

Unique Renal Trauma—*Anthony A. Borski* 573

Homozygous Hemoglobin C Disease: Relation to Military Service—*Robert D. Gens* 577

Meconium Ileus: With Cystic Pancreatic Fibrosis and Early Pulmonary Complications—*Melvin E. Jenkins and Evan W. Schear* 581

Rupture of the Esophagus by Compressed Carbon Dioxide—*R. Maurice Hood* 587

DEPARTMENTS

A Message From the A. M. A. 591

DEPARTMENTS—Continued

Aero Medical Association Meeting 593
New Commanding Officer at Landstuhl Army Medical Center 594
Officers Certified by Specialty Boards 595
The James Stevens Simmons Memorial Professorship 598
Unusual Military Medicine Course 599
Army Medical Officer Honored 600
National Industrial Health Conference 601
Death 602
Dental Association Official Visits Air Force Base 603
Correspondence 604
Air Force Nurse Awarded Legion of Merit 606

BOOKS

Reviews of Recent Books 607
New Books Received 623

Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal*.

FRANK B. BERRY, M. D.,
Assistant Secretary of Defense (Health and Medical).

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TREATMENT OF PNEUMOMEDIASTINUM WITH INCREASED AIR PRESSURE

JOHN H. SCHULTE, *Lieutenant Commander, MC, USN*

PNEUMOMEDIASTINUM was first described in 1819 by Laennec.[1] Since that time there has been a continual increase in knowledge concerning the pathogenesis, signs, symptoms, and differential diagnosis, but little advancement in the treatment of this condition. This article reports two cases of pneumomediastinum that were treated successfully with increased ambient air pressure, a method which has not been previously described in the literature for the treatment of this condition.

PATHOGENESIS

Air may gain access into the mediastinum by one of five avenues: (1) directly into the mediastinum from perforation or surgical procedures on the upper respiratory system and esophagus; (2) dissection of air from the deep fascial planes of the neck; (3) dissection of air from the retroperitoneal space; (4) rupture of the alveoli into the pulmonary interstitial tissue; and (5) dissection of air from the deep fascial planes of the anterior abdominal wall during pneumoperitoneum.[2]

SYMPTOMATOLOGY

The onset of symptoms varies from a few minutes to a few days. This may be of importance in the differential diagnosis from air embolism which is usually immediate. The development of convulsions, which may occur in air embolism, has never to my knowledge been reported in a case of pneumomediastinum.

From U. S. Naval Medical Research Laboratory, U. S. Naval Submarine Base, New London, Conn. Comdr. Schulte is now at Pittsburgh Area Field Office, Atomic Energy Commission, Idaho Falls, Idaho.

The usual symptoms in this condition are substernal distress or fullness, sore throat, hoarseness, dysphagia, choking sensations, dyspnea, and varying degrees of respiratory embarrassment.

The physical examination may reveal cyanosis, and subcutaneous emphysema of the neck, chest wall, and the abdomen. A tympanitic percussion note may replace the normal substernal dullness. Distant heart sounds and a crunching sound synchronous with the heart beat (Hamman's sign) have been noted.

Roentgenograms of the chest reveal the presence of air in the fascial planes and in the mediastinum, especially in the oblique and lateral views. This may extend into the neck and be demonstrated in the roentgenograms of the neck. No characteristic electrocardiographic pattern is produced by pneumomediastinum.[3]

TREATMENT

Treatment has consisted of observation, bed rest, and symptomatic therapy in mild cases, with gradual resorption of the gas over a period of several days. In more severe cases, needle aspiration or catheterization and suction through the suprasternal notch or an intercostal space have been attempted to remove the excess gas from the tissue spaces.

CASE REPORTS

Case 1. A 25-year-old man began taking the routine pressure test in the recompression chamber as a preliminary part of his submarine escape training. During the application of pressure he experienced a great deal of difficulty equalizing the pressure in his middle ears.

The instructor in the chamber noticed that he used the Valsalva maneuver to maintain ear equalization and advised the man against using excessive force. The instructor stopped increasing pressure several times to allow the man to regain his equalization.

The required pressure (50 lb/sq. in., indicated gage pressure; *i. e.*, 64.7 lb/sq. in., absolute pressure) was reached in seven and one-half minutes. The man experienced no further difficulty and the pressure was released at the normal rate of 12 lb/sq.in./min. Upon return to sea level pressure, the man complained of pain in both ears, tinnitus, and soreness of the neck muscles.

Physical examination revealed crepitation in the anterior cervical triangles and a grade 3 aerotitis media (Teed's classification)[4] bilaterally. No other physical abnormalities were found.

The patient was put at bed rest under observation. Four hours later his symptoms had subsided and he was allowed to return to his home. He was instructed to call the escape training tank officer immediately upon any change in his condition.

Early the same evening he called the training tank officer complaining of soreness in the neck, difficulty in breathing, tightness in the chest, and inability to swallow anything other than liquids. He also noticed that his voice had become deeper in pitch. He stated that the symptoms had developed slowly and progressively since leaving the pressure chamber that morning.

Upon physical examination he appeared moderately apprehensive but in no acute distress. His blood pressure was 110/85 mm Hg; pulse, 120,

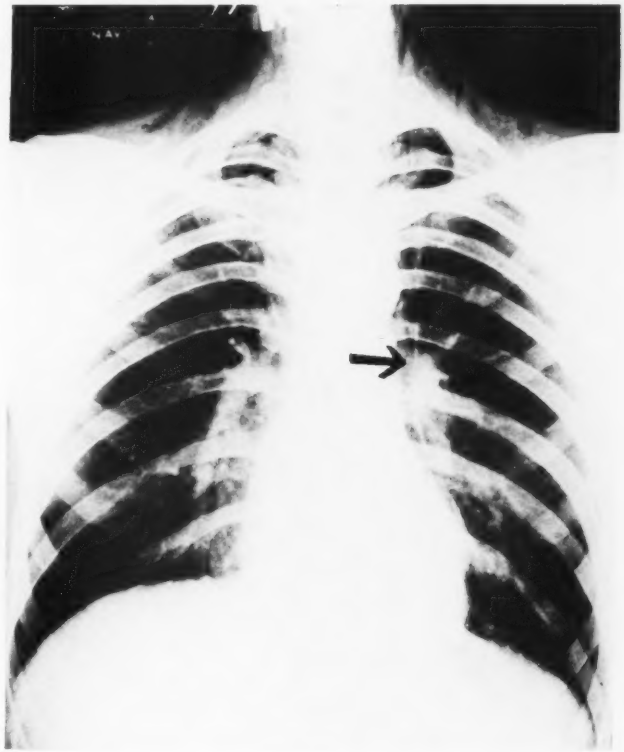

Figure 1 (case 1). Posteroanterior view of the chest demonstrating free air in the mediastinum and extending into the neck.

weak, slightly irregular, and thready; and respiration rapid and shallow. There was palpable crepitation throughout both anterior cervical triangles. The ears revealed a grade 3 aerotitis media bilaterally. There was minimal injection of the posterior pharynx. Examination of the chest

revealed normal lung fields. The precordium and the mediastinum were tympanitic to percussion. Heart sounds were irregular and distant, becoming inaudible when the patient leaned forward. Roentgenograms revealed air in the mediastinum and extending into the neck (figs. 1 and 2).

The man was placed in the recompression chamber, and pressure treatment was begun. At 14 lb/sq. in. indicated gage pressure he stated the tightness in his chest was somewhat relieved. Physical examination revealed no appreciable change in the physical findings.

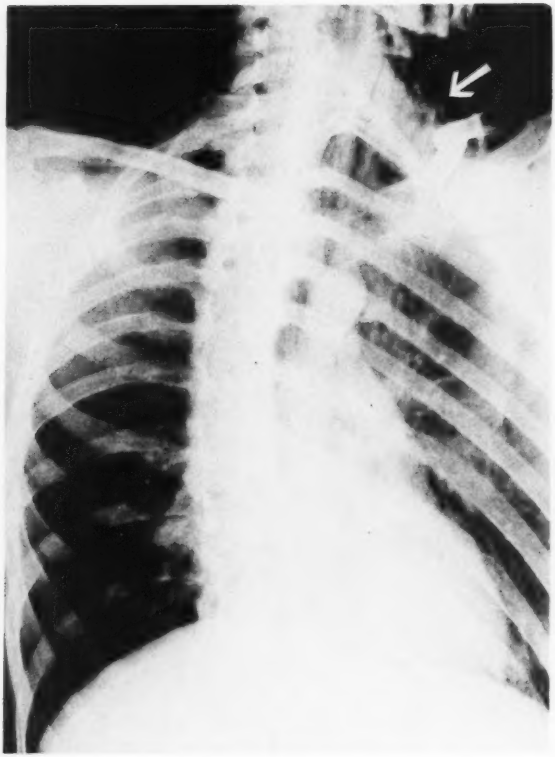

Figure 2 (case 1). Oblique view of the chest. Note large bubble of air in the subcutaneous tissue over the left clavicle.

Recompression was continued until 44.5 lb/sq. in. indicated gage pressure was reached. The patient stated that he had complete relief of symptoms. His voice had returned to its normal pitch.

Physical examination revealed a blood pressure of 125/65 mm Hg and a regular pulse with a rate of 92/min. Percussion of the chest revealed

normal mediastinal and precordial dullness. The heart sounds were good and regular. Some crepitation still persisted in the neck.

Recompression was continued to 75 lb/sq. in. indicated gage pressure, and treatment in accordance with Navy treatment tables begun.[5] Upon reaching atmospheric pressure (O lb/sq. in. gage pressure) approximately 20 hours later, the man was completely asymptomatic except for some muscle soreness in the anterior neck muscles. Physical examination was negative except for a slight amount of crepitus over the

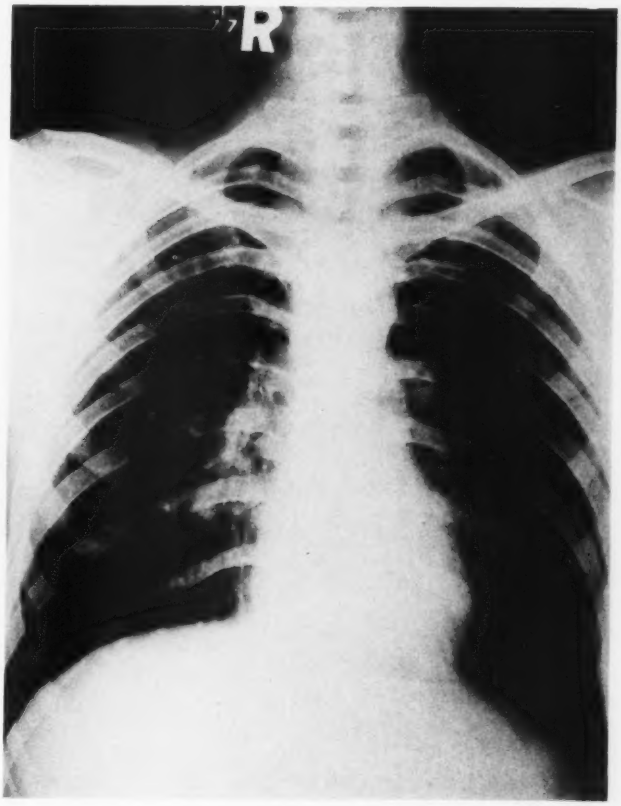

Figure 3 (case 1). Posteroanterior view of the chest immediately after treatment, showing complete resorption of the air in the tissues.

sternocleidomastoid muscles. He was transferred to the infirmary for 24 hours' observation.

Upon discharge from the infirmary, he was asymptomatic. Physical examination was completely negative. Roentgenograms of the chest and

neck revealed complete resorption of gas, and an electrocardiogram revealed no evidence of cardiac damage (fig. 3).

Case 2. A 24-year-old man developed mild chest pain while making simulated submarine "free" escapes from depths of 18 and 50 feet (8 and 14 lb/sq. in. gage pressures, respectively) in the submarine escape training tank.

During the afternoon the discomfort continued but did not incapacitate him from playing a round of golf. By evening the man noted substernal fullness, mild dyspnea, dysphagia, hoarseness, deepening of the voice, and pain in the neck on motion in any direction.

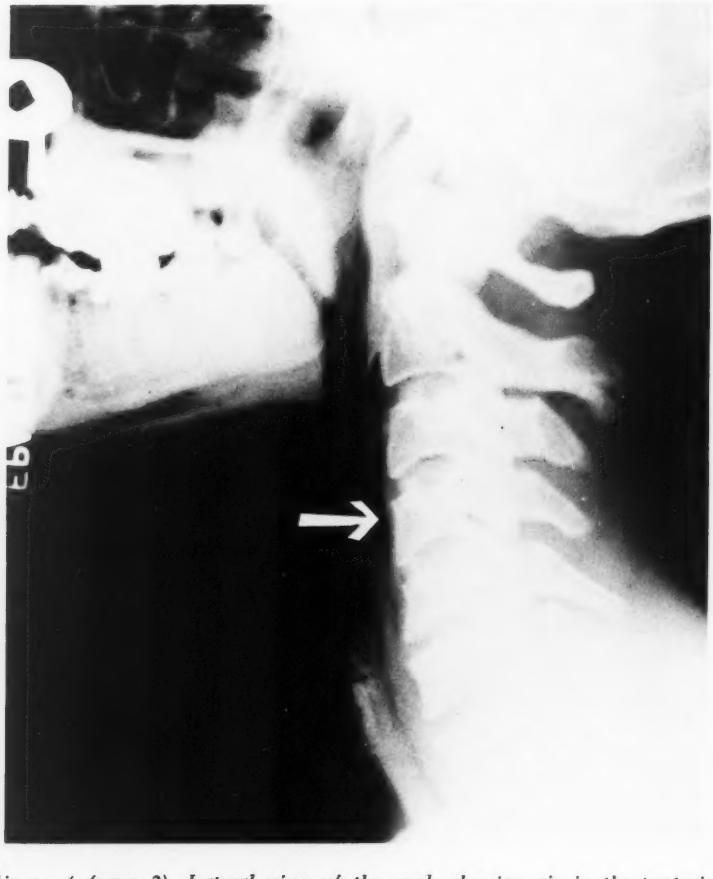

Figure 4 (case 2). Lateral view of the neck showing air in the posterior pharyngeal wall extending into the superior mediastinum.

Physical examination revealed a white male of stated age in no apparent distress. His blood pressure was 110/75 mm Hg; pulse, 72, full and regular; respiration, 20/min, and somewhat cogwheel.

There was resistance and pain in the neck on movement of the head. A small area of crepitation was noted at the medial edge of the right sternocleidomastoid muscle. There was moderate congestion of the nasal mucosa, posterior pharynx, larynx, vocal cords, and epiglottis. The chest was clear to palpation, percussion, and auscultation. Roentgenograms revealed air in the retropharyngeal space extending into the mediastinum (fig. 4).

The man was placed in the recompression chamber and pressure treatment was begun. Upon reaching 75 lb/sq. in. gage pressure, the patient was completely relieved of his symptoms and his voice had returned to normal. The crepitus noted on previous physical examination had completely disappeared. There was no limitation of motion in the head or neck. Treatment was carried out in accordance with the standard Navy treatment tables.[5]

After completion of treatment, the man remained asymptomatic and physical examination was completely negative. He was transferred to the infirmary for observation. Twenty-four hours later he was returned to duty. Roentgenograms of the chest and neck demonstrated complete resorption of the air.

DISCUSSION

Rupture of the alveoli allowing air to enter the pulmonary interstitial tissue is the probable cause for the development of pneumomediastinum in both of these men.

The first man ruptured his alveoli by using the Valsalva maneuver too forcefully while attempting to equalize pressure in his middle ears during a pressure test. The second man apparently allowed the air pressure in his chest to exceed the outside water pressure while ascending through the water when making simulated submarine escapes.

Peabody and Buechner[2] demonstrated in dogs that rupture of the alveoli allowed air to dissect along the perivascular and peribronchial interstitial tissue into the mediastinum. The air entered the interstitial tissue during inspiration and was slowly milked toward the mediastinum during expiration. This explains the gradual onset and progressive increase in symptoms typical of this type of pneumomediastinum.

The use of increased ambient air pressure is standard practice in decompression sickness (bends) and in air embolism in divers.[6,7] The rationale for using increased pressure is that gas bubbles in tissues will be more rapidly reduced in size. The ap-

plication of 75 lb/sq. in. gage pressure (6 atmospheres, absolute) reduces the size of a gas bubble to one sixth its original volume, thus allowing a more rapid reabsorption of gas into the body fluids and elimination through the lungs.

The interstitial gas bubble in the mediastinum will respond to increased pressure in the same manner as the intracellular gas bubbles of decompression sickness or the intravascular gas bubbles of air embolism. It can, therefore, be expected that pneumomediastinum will respond well to this form of therapy.

SUMMARY

The treatment of pneumomediastinum has in the past been primarily symptomatic. In severe cases attempts were made to aspirate the air through the suprasternal notch or an intercostal space.

Two patients with clinical and roentgenologic evidence of pneumomediastinum who were treated by exposing them to increased ambient air pressure, which was then gradually reduced, made rapid and complete recoveries. One patient had developed the pneumomediastinum when he performed a forceful Valsalva maneuver while being subjected to a routine pressure test in the recompression chamber as a part of his submarine escape training. The other patient had developed it while making simulated "free" escapes in the submarine escape training tank.

This method of treating pneumomediastinum has not been reported previously in the literature. Its degree of success and the rate of recovery observed were far superior to results obtained with older forms of treatment.

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SERIOUS HEART DISEASE SIMULATED BY HIATUS HERNIA

EDDY D. PALMER, *Lieutenant Colonel, MC, USA*

DURING management of 214 patients with the direct or "sliding" type of hiatus hernia, 11 were encountered who presented the classical symptoms of angina pectoris and three who showed the classical manifestations of acute myocardial infarction. Several other patients with more complicated clinical pictures had complaints that suggested coronary artery disease in addition to various forms of dyspepsia.

The problem which patients of this category create concerns much more than mere differentiation of heart disease from hiatus hernia. Some patients clearly have both, without apparent causal association, as did nine of the 214. Others appear to show significant coronary artery repercussions resulting from some form of autonomic reflex sparked by the activities of the displaced gastric sac. It has not been possible to date to define the degree of influence that the one organ may have over the other during various physiologic and pathophysiologic activities, because animal experiments are clearly not applicable to the human and because among humans there appears to be a very wide individual variation in coronary artery response to visceral stimulation.

The present report is concerned only with clinical differentiation of heart disease from hiatus hernia. The importance of the differentiation needs no emphasis, but it is worth noting that the 11 patients who had been carrying the diagnosis of coronary insufficiency had been needlessly living the restricted and frightened lives of angina pectoris patients for an average of more than eight months. Following are brief reports on a typical case of hiatus hernia mimicking coronary insufficiency and on the three instances of misdiagnosed infarction.

CASE REPORTS

Case 1. This 45-year-old medical officer was engaged in moving heavy equipment during the invasion of Normandy in 1944, when he was seized by a constricting pain deep in the chest with aching radiation down

From 2d General Hospital, APO 180, New York, N. Y.

his left arm. An electrocardiogram made five hours later was found to be normal, and he returned to his arduous duties. He was in active combat for a month before he was studied in any detail. Meanwhile, he had four recurrences, either during physical strain or during meals. Detailed cardiac studies were normal, but a small hiatus hernia was discovered. The diagnosis of coronary insufficiency was, nevertheless, made, and he was eventually separated from the Army by disability retirement. During the next three years he had many recurrences of the same type of pain, lasting 2 to 10 minutes at a time and clearing spontaneously with rest. He found that on only some occasions would prescribed nitroglycerin help. Three times he vomited small amounts of bright blood, this being the only overt gastro-intestinal symptom. Hospitalization and restudy on three further occasions led to confirmation of the diagnosis of coronary insufficiency. Now, upon the current hospitalization the cardiologist was not able to find any heart disease nor from the previous records could he confirm the previous diagnosis. A hiatus hernia was again found roentgenologically, and esophagoscopic examination showed moderate subacute erosive esophagitis. The esophagogastric junction lay 2 cm proximal to the hiatus. The hernia was repaired surgically. During the 15-month follow-up period there were no further pain recurrences.

Case 2. This 54-year-old white man, previously well, was wakened one night by a severe crushing pain over the middle of the chest anteriorly. It cleared spontaneously after about two minutes, but during the next morning it returned four times while he was at rest, becoming progressively more sustained. It was accompanied by a smothering sensation. He was hospitalized with the diagnosis of myocardial infarction. Physical examination revealed a frightened patient who was sweating and exhibiting moderate tachycardia. There was no cyanosis and the respirations were quiet and easy. The blood pressure, heart, lungs, and abdomen appeared to be normal. Subsequent studies showed repeatedly normal electrocardiograms, sedimentation rate, white blood cell count, roentgenograms of the chest, and temperature. Contrast fluoroscopy revealed a small direct hiatus hernia, and esophagoscopic study confirmed the diagnosis and demonstrated complicating erosive esophagitis. Medical management was decided upon for the moment, but because of a recurrence two months later surgical repair was accomplished. Revaluation 13 months later showed that there had been no further pain or other complaint.

Case 3. During a period of 13 years this 43-year-old white man had six episodes of bursting epigastric pain, rising through the chest to the neck, jaw, eyes, shoulders, and arms. On two occasions the pain had been accompanied by sweating, hypotension, unconsciousness, and incontinence. The attacks had appeared in an entirely unpredictable fashion, without relationship to any activity. They lasted from one-half to two hours. The patient had been hospitalized on each occasion and treated at the outset as a case of myocardial infarction.

Some of the records were available now, during the current hospitalization. The long series of electrocardiograms showed no abnormalities except for temporary ischemic changes over a five-day period three years previously. A 2-cm hiatus hernia had been demonstrated on two occasions. Surgical correction was now recommended but the patient would accept no more than a trial phrenic crush, having been convinced that he had serious heart disease. After three asymptomatic months, he thought that the point had been proved and underwent hiatal repair.

Case 4. This 64-year-old hypertensive woman, who had complained of pyrosis for several years, was wakened one night by severe, heavy substernal and epigastric pain. She felt as though she were being smothered and found it difficult to get her breath. Because she lived alone, she was not able to get help. Upon attempting to rise, she fainted briefly and broke out in a cold sweat. After seven hours the pain gradually went away and she was able to go to the hospital. The history revealed two previous spells of similar but briefer and milder pain during the previous five months. The second time she was hospitalized for six weeks and discharged with the diagnosis of myocardial infarction. Admission examination now revealed only fear, tiredness, and moderate hypertension. All routine and special cardiac studies were otherwise normal, but a small hiatus hernia was found by roentgenographic and esophagoscopic study. The hernia was repaired surgically. Postal reports to the present, 21 months later, have indicated that there has been no further pain.

COMMENT

It is not being suggested that it is an easy matter to avoid mistakes like this but rather that, because not all substernal pain is heart pain, failure of objective studies to confirm the clinical impression of heart disease necessitates revaluation of the whole problem. The most disturbing attitude to be found in this situation is that the most serious possible diagnosis must be accepted as the working diagnosis because of the potential consequences of an error in the other direction. Much depends, quite naturally, on the clinician's individual subspecialty orientation or his special interests. The previous clinical records of the present group of patients contained many references to the clinician's insecurity over the normal or slightly abnormal electrocardiographic and other studies. Often this was covered by a statement to the effect that the best cardiologic teachings indicate that electrocardiographic abnormalities do not always occur in instances of overt coronary artery disease, even when there is infarction, and that, regardless, the clinical impression must take precedence over objective testing methods. A substantial misleading factor in the cases of "angina pectoris" was the therapeutic test of symptomatic response to nitroglycerin. It

appears to be a poorly recognized fact that the pain of hiatus hernia, as well as that of several types of esophageal dyskinesia, responds rather well to the nitrites. No comfort regarding the diagnosis of coronary insufficiency should be taken from the results of such a therapeutic regimen.

One of the important considerations in all dealings with the symptomatology of hiatus hernia is that, as a rule, the smaller a hiatus hernia is, the more severe are the subjective manifestations. The hernias among the present group of 14 patients were 2 to 3 cm in extent but no larger. The hernias in some of the other patients in the whole series were very much larger, but among them the symptoms included no sudden or severe pains. Quite naturally, the smaller a hiatus hernia is, the more difficult the diagnosis is to establish—and the more difficult it is to convince one's surgical colleagues that repair is indicated.

It is an important error to assume that a normal upper gastrointestinal x-ray series excludes the diagnosis of hiatus hernia. Not only must the radiologist use special technics if he is to demonstrate the lesion, but also in many cases the herniation is an intermittent affair, spontaneously undergoing reduction which cannot be quickly reproduced on the fluoroscopy table. Among the 214 cases, a single roentgenographic series demonstrated the lesion in only 78 per cent, and repeated studies in only 85 per cent. The results of esophagoscopic examination were a little better, the figures being 85 and 88 per cent, respectively, but the important point is that both examination technics are required before the possibility of hiatus hernia can reasonably be excluded.

SUMMARY AND CONCLUSION

Seven per cent of 214 patients with direct hiatus hernia presented the classical symptomatology of either coronary artery insufficiency or myocardial infarction and were treated for variable periods of time as cardiac patients. The most important error involved, in addition to lack of awareness over the cardiac-mimicking potentialities of hiatus hernia, was failure to accept the normal results of objective studies because the clinical features of heart disease seemed so evident. Hiatus hernia is not always an easy diagnosis to establish, and this is an especially important consideration when it comes to differentiation from coronary artery disease, for the smaller a hiatus hernia is, the more likely it is to cause severe chest pain.

BILIARY RADIOMANOMETRY

MAX L. SMITH, *Lieutenant Colonel, MC, USA*
MANUEL SANTOS, M. D.

BILIARY radiomanometry is really a refinement of cholangiography. It is a diagnostic technic in which pressure readings and contrast roentgen studies are done simultaneously. Both of these technics have been used separately for a long time, but it is their rather recent combination into one study that makes the technic more valuable.

Since the days of Oddi,[1] manometric studies have been made in which water, bile, and mercury were used as perfusing agents. These have contributed greatly to our knowledge of the physiology of the biliary tracts. Mirizzi[2,3] proposed the use of routine operative cholangiography. This simple method gives excellent morphologic images of the bile ducts, but there may be abnormalities of the two sphincter areas which are not detectable by the hand or eye of the surgeon or by a single picture of the bile ducts which have been filled with opaque liquid. These abnormalities can only be detected by the slight variations of pressure which are necessary to permit fluid to pass these zones.

During the past 25 years of the more or less widespread use of cholangiography, the results of biliary surgery have failed to be entirely satisfactory. Great emphasis has been placed on the detection of stones, but the functional and the combined functional organic disorders of the biliary apparatus have remained largely unsolved. Many studies of the late results after biliary surgery indicate the need for a better diagnostic method, both preoperatively and during surgical intervention.

Sandweiss and Fulton,[4] in analyzing a series of patients who had undergone cholecystectomy for cholelithiasis, found moderate to severe symptoms persisting in 10 to 25 per cent. When the procedure was carried out for the noncalculous gallbladder, the number of patients having symptoms increased to 50 per cent. Schildt[5] reviewed a group of 500 patients who underwent biliary surgery between 1950 and 1952 and found that only 70 per cent were symptom free. In 1952, Coleman and Bennett[6] found 68 recurrences of symptoms in 487 cholecystectomies.

From Walter Reed Army Hospital, Washington, D.C. Dr. Santos was Official Observer at this hospital from Universidad de Chile (Catedra Prof. Velasco S.)

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Reports after surgery on the common duct also indicate that there is a need for better diagnosis and treatment. Preston and Alden[7] analyzed 74 postoperative cholangiograms made through an indwelling T-tube after common duct surgery and found normal common ducts in only 56.7 per cent, stones in the common duct in 24.3 per cent, and partial or complete obstruction of the distal third of the common duct in the remaining 19 per cent. The reported incidence of residual common duct calculi ranges from 2 to 33 per cent.[8]

Biliary radiomanometry fills some gaps in the interpretation of the roentgen films taken without fluoroscopy, because the curves of biliary pressures obtained give information which is in many ways equivalent to that found on a fluoroscopic examination.

Caroli and Maury,[9] in 1937, were the first to use this combined technic in which multiple views of the dye-filled biliary ducts were taken at different pressures. This technic has been varied and perfected by numerous surgeons abroad, particularly by Mallet-Guy,[10] Albot, Olivier, and Libaude,[11] and Kapandji.[12]

The principle of this technic is simple and consists of a graduated glass-tube manometer being connected to a source of radiopaque dye and to the patient's biliary tree, either the gallbladder or the common duct. This apparatus, together with conveniently arranged x-ray equipment, is designed to take several views of the biliary system while the radiopaque material runs from the perfusion system under controlled pressures.

APPARATUS AND METHODS

The apparatus we use is similar to that described by Jacques Caroli[13] (fig. 1). It consists of a glass flask of approximately 150-ml capacity which contains the contrast media. This flask is connected to a 20-ml syringe arranged to maintain a constant level of fluid in the syringe, irrespective of the rate of perfusion. Thirty-five per cent Diodrast solution (brand of iodopyracet) may be used as the contrast media. The syringe is connected to a glass manometer and to the patient's biliary tract by a Y-tube. The perfusing system, consisting of the glass flask and the syringe, is held rigidly together and can be raised or lowered as the pressure is increased or decreased. The glass tube manometer should be approximately 75 cm long and 8 mm in diameter. The centimeter markings should be clearly visible for a distance of several feet. This apparatus may be connected to a kymograph to permit the recording on a graph of the variations of pressures during the exploration.

The rubber tubing connecting the various parts of the apparatus should be heavy enough to prevent kinking and have at least an 8-mm diameter to prevent significant capillary action. A zero point on the patient is established at the level of the biliary ducts. For

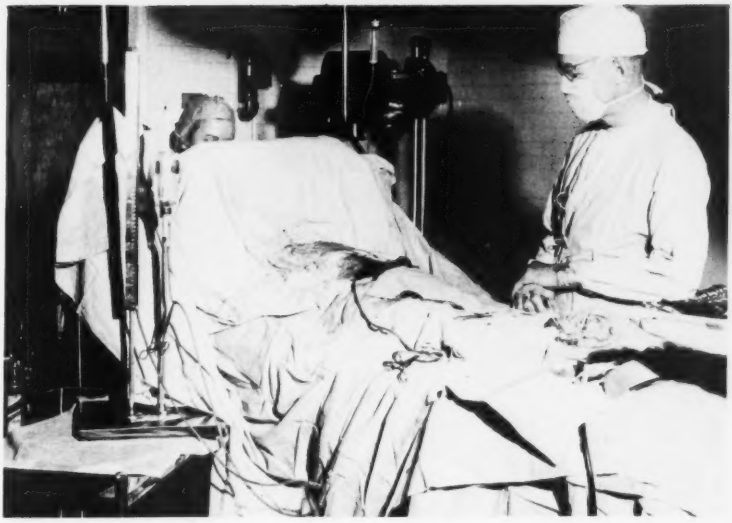


Figure 1. Manometric apparatus in use in the operating room.

practical purposes this may be considered to be midway in the trunk between the anterior and posterior abdominal walls. Zero point on the manometer and the fluid level in the syringe of the perfusing apparatus must be brought to the same level of the bile duct being investigated before beginning the study. All air bubbles should be removed from the tubing before the studies are begun to avoid producing radiolucent defects in the bile ducts (fig. 2). If the gallbladder is being studied, it is most convenient to introduce a corrugated needle which can be tied in position with a purse-string suture. If the common duct is being investigated, it is convenient to introduce through the cystic duct a curved cannula similar to the one devised by Mallet-Guy (fig. 3). In the absence of these two pieces of apparatus, other types of catheter or plastic tubing may be used.

The use of morphine preoperatively should be avoided. The patient is placed on a flat box on the operating table, and general anesthesia given. The box has an opening at the head of the table through which the cassettes can be very readily positioned and removed. This avoids the necessity for getting under the drapes for each x-ray exposure. A scout film is taken to check the position of the cassette and the quality of the film before surgical intervention is begun. The radiomanometric study should be done with minimal manipulation of the biliary tree.

Biliary manometry of the gallbladder is only worthwhile when no obvious pathologic disorder is found on inspection or palpation

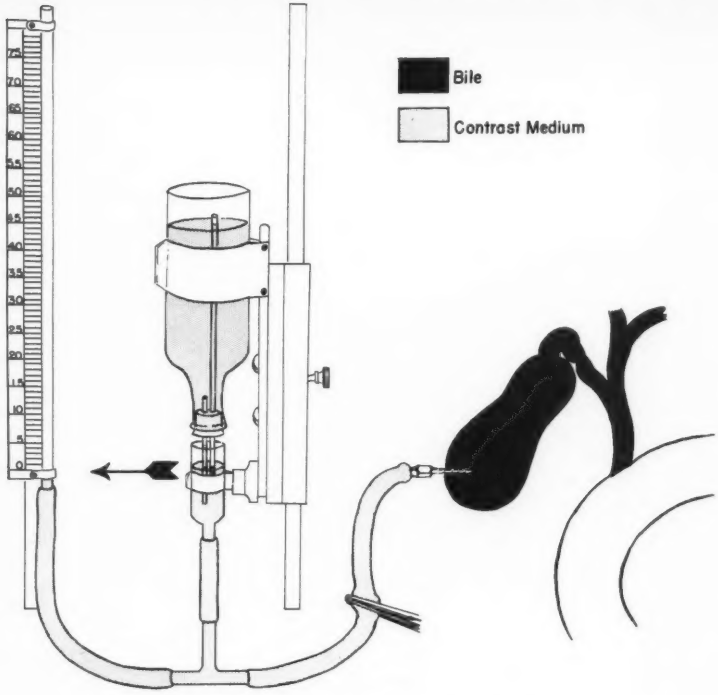


Figure 2. Establishing the zero points.

of the gallbladder. In the presence of gross pathologic disease in the gallbladder, the cystic duct should be exposed and cannulated for a study of the common duct before the gallbladder is removed.

PRESSURE DETERMINATIONS

The first pressure to be determined in the gallbladder is the *initial intracavitary pressure* which represents the hydrostatic pressure present in the biliary system before any interference. With the apparatus at zero level, the cannula is inserted without spilling bile. The perfusion system is clamped off. Bile will be seen in the transparent tubing leading from the gallbladder, and the rise in the fluid level in the manometer is noted. This intracavitary pressure in the gallbladder is normally about 6 to 8 cm of Diodrast. The determination of this pressure is important, in order to compare it with the pressure necessary to open the sphincter mechanism. When studying intracavitary pressure in the common duct a special needle which can be inserted directly into the duct without spilling the bile is needed (fig. 4).

Figure 3. Mallet-Guy's cannula for use through the cystic duct and his needle for direct puncture of the gallbladder.

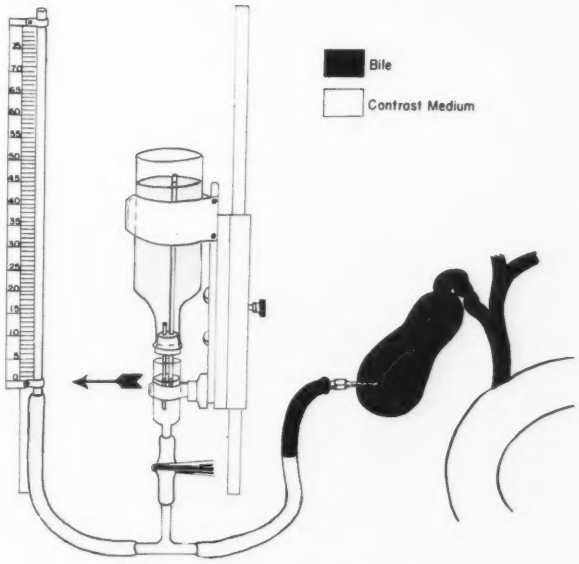


Figure 4. Determining the intracavitary pressure.

At this point in the procedure, the tube leading from the perfusing syringe is opened and the apparatus is raised a few centimeters at a time to determine the pressure required to open the sphincter. The tube is clamped after every elevation. At a certain point, the fluid level in the manometer will suddenly drop, indicating that the dye has passed through the cystic duct, if the gallbladder is being studied, or through the sphincter of Oddi, if the common duct is being studied. This is called the *transit pressure* and should normally be in the vicinity of 10 to 15 cm in the gallbladder and 9 to 11 cm in the common duct (fig. 5).

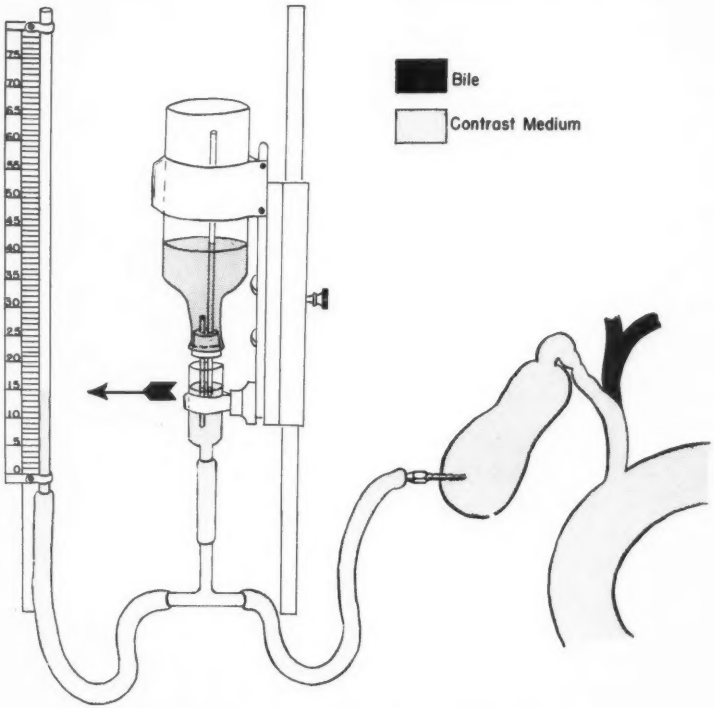


Figure 5. Transit pressure.

The clamp is left on the tube leading from the perfusing bottle. After several minutes, the fluid level in the manometer will stabilize at a point normally about 4 to 5 cm below the transit pressure of the cystic duct and 2 to 3 cm below that of the common duct. This represents the *residual pressure* (fig. 6). These two pressures, the *transit and residual,* should be repeated two or three times and films taken at each pressure.

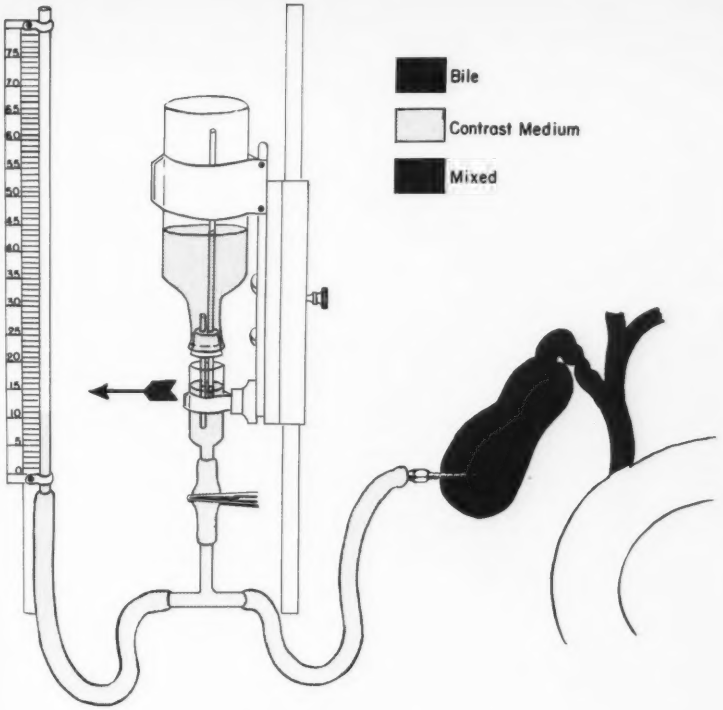


Figure 6. Residual pressure.

Under normal conditions the transit pressure of the common duct must be lower than that of the cystic duct, otherwise emptying of the gallbladder would produce hypertension in the common duct. The pressures first described are the ones we have recorded during operations. Other investigators have made these studies preoperatively by transhepatovesicular puncture[12] or postoperatively through a cholecystostomy or T-tube.

DISCUSSION

Biliary radiomanometrics has been used by its originators to study the sphincter systems of the gallbladder and the common duct in patients who have been subjected to intubations of these organs. Reactions to drugs and various stimuli have been determined by this technic. The physiologic individuality of the gallbladder sphincter as a neuromuscular apparatus of the gallbladder neck and cystic duct has been established.

Morphine has a more pronounced action on the gallbladder sphincter than on the common duct sphincter. It may throw the

whole gallbladder sphincter mechanism, or isolated parts of it, into spasm. It produces a tonic spasm of the wall of the second portion of the duodenum and the common duct sphincter. While morphine causes a contraction of the gallbladder sphincteric muscular area alone, a fatty meal will throw the entire gallbladder and its sphincter apparatus into spasm.

Amyl nitrite suppresses functional spasm of muscle tissue in the gallbladder sphincter area. Through its action on the smooth muscle, it relaxes the sphincter of the common duct and the entire duodenum in less than two minutes. Atropine produces a paralytic dilation of the wall of the second portion of the duodenum and releases the sphincter of the distal common duct. It has the same effect on the gallbladder sphincter. Atropine and amyl nitrite are very useful in differentiating organic from spasmodic stenosis in these areas.

By radiomanometric study of the Meltzer-Lyon test, Caroli[13] concluded that the results depend on (1) an acceleration of the bile flow from the liver; (2) relaxation of the duodenal wall, the sphincter of Oddi, and of the gallbladder; and (3) slight to moderate contracture of the gallbladder. This test does not depend on the integrity of the sphincter of Oddi, inasmuch as the same train of events occurs if there has been a choledochoduodenostomy.

Debouvry,[14] in his thesis, stated that he had never observed a pharmacodynamic action of a drug on the common duct opening that was not the same on the wall of the duodenum.

Biliary radiomanometrics has achieved its greatest usefulness in elucidating the functional and organofunctional disorders of the biliary apparatus. These syndromes, although long suspected, could not be accurately delineated by simple cholangiography. Chronic noncalculous cholecystitis is the general term used to include these disorders which have been variously called "cholecystatonia," "irritable gallbladder," "intolerant gallbladder," et cetera. By means of the radiomanometric test, the French authors have been able to group the different functional diseases of the biliary tract into three entities: the hypotonias, the hypertonias, and the hyperesthesias.

By this technic it has been possible to show that "strawberry gallbladder" or "lipoidosis of the gallbladder" is an entity that starts as a chronic inflammatory lesion of the cystic duct, which later gradually involves the neck and body of the gallbladder. The condition is shown by manometric evidence of partial obstruction and a climbing residual pressure.

ABNORMAL RADIOMANOMETRIC FINDINGS

Obstruction of the cystic duct may be partial or total. It may be impossible to produce passage of dye through the cystic duct with

pressures up to 50 cm of 35 per cent Diodrast solution. If this is functional, it will be overcome in a few seconds with inhalation of amyl nitrite. If amyl nitrite has no effect, it is an indication of an organic lesion. Because this is not usually evident on inspection or palpation, we must rely on this test to indicate that a normal-appearing gallbladder should be removed.

If transit through the cystic duct is accomplished, but only at an abnormally high pressure, and this is not relieved by inhalation of amyl nitrite, a partial organic obstruction may be assumed to exist. This is also an indication for cholecystectomy. The cystic duct, if studied microscopically, will demonstrate the presence of an organic lesion.

CASE REPORTS

Case 1. A 44-year-old man with several years' history of alcoholism, upper abdominal pain, nausea, and vomiting had a subtotal gastrectomy for postbulbar duodenal ulcer in November 1953. He was not helped by this operation. Serum amylase determinations made subsequent to this operation were elevated. On 1 April 1956 an exploratory operation was performed and a diagnosis of chronic recurrent pancreatitis made. The gallbladder was thin-walled and no abnormality was felt on palpation or inspection of the gallbladder or cystic duct. There were several large nodes about the common duct and a localized induration in the head of the pancreas. Manometric studies of the gallbladder, with 35 per cent Diodrast solution repeated twice, gave a transit pressure of 35 cm and a residual pressure of about 34 centimeters. There was almost imperceptible passage of dye through the cystic duct. Transit and residual pressures of the common duct were also elevated, and a transduodenal sphincterotomy was performed.

Pathologic findings. Microscopic study (hematoxylin and eosin stain) of a biopsy specimen of the gallbladder wall showed markedly dilated Rokitansky-Aschoff sinuses and minimal chronic inflammatory infiltrate (fig. 7). Cross section of the cystic duct showed thickening of the wall and chronic inflammatory reaction (fig. 8).

Comment. Obstruction of the common duct may be complete or partial, as in the cystic duct, and the same tests with amyl nitrite will differentiate functional disturbances. Radiomanometric examination of this area will help reduce the 50 per cent postcholecystectomy disease seen after removal of the noncalculous gallbladder. It is much easier to overlook pathology in the common duct than in the gallbladder when relying only on inspection and palpation.

A raising of the transit pressure above normal may be the only clue to a disorder of the lower common duct if on repeated determinations of residual pressure it is found to be higher at each reading. The syndrome is recognized as the climbing or upgraded residual pressure of the common duct. This is usually due to

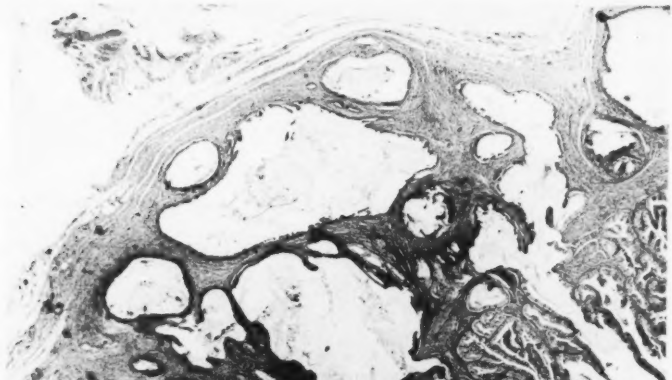
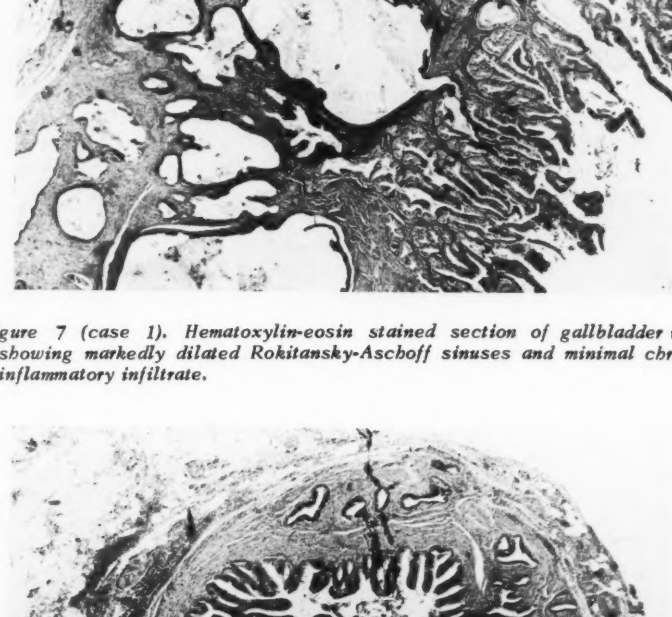


Figure 7 (case 1). Hematoxylin-eosin stained section of gallbladder wall showing markedly dilated Rokitansky-Aschoff sinuses and minimal chronic inflammatory infiltrate.



(Figure 8 (case 1). Cross section of cystic duct showing thickening of the wall and chronic inflammatory reaction.

irregularities or inflammation of the sphincter of Oddi and the surrounding duodenum. Residual odditis is one of the most frequent and poorly understood causes of complications after cholecystectomy or choledochotomy for lithiasis. When slight hypertension of the sphincter of Oddi is confirmed, even in the face of normal appearing cholangiograms, the common duct should be decompressed by drainage or sphincterotomy.

Case 2. A 66-year-old woman had a cholecystectomy in January 1956 because of nonvisualization of the gallbladder and recurring epigastric pain. This was reported pathologically as normal. She was admitted in June with slight jaundice. An exploratory operation was performed on 31 July. No cystic duct stump remained. The common duct and pancreas were normal to palpation and inspection. Manometric readings of the common duct were slightly elevated. The initial transit pressure was 15 cm of 35 per cent Diodrast solution. The residual pressure was 13 centimeters. On repeated readings these rose to 20 and 18, respectively. Five cholangiograms, taken at various pressures, revealed only abnormal injection of the hepatic radicles. The common duct was not particularly enlarged, and dye appeared in the duodenum. The duodenum was opened and a sclerotic, partly stenosed papilla was incised.

Histologic findings. Histologic examination of a biopsy specimen from the papilla showed a chronic inflammatory reaction with scarring involving the common bile duct and the immediate duodenal mucosa.

Comment. If the hepatic radicles or the duct of Wirsung are filled under a normal pressure of from 10 to 15 cm some degree of obstruction at the papilla of Vater is suggested.

Cattell[15] stated that he and his associates surgically explored the common duct in 35 to 45 per cent of all gallbladder cases in order to avoid overlooked stones. Routine use of radiomanometric study of the common duct through the cystic duct should provide more exact indications for surgical attack on the common duct.

The value of this technic of peroperative common duct radiomanometry over the methods of inspection, palpation, simple cholangiography, and surgical exploration of the common duct, available to surgeons today, is typified in the experience of Mallet-Guy.[10] In order to evaluate this procedure he surgically explored 100 common ducts containing stones. After the common duct had been opened, explored, and the stones removed, radiomanometric studies were made on these ducts. By this procedure 12 were found to still contain undetected stones or fragments. Two showed compression by pancreatitis. Five contained noncalculous obstruction. Twenty-two presented hypertonic reactions of the sphincter, some of which may have been the result of instrumentation. Causes for fistula and postoperative recurrence were thereby reduced.

Surgeons who have done cholangiograms at the time of operation have been dissatisfied with them, because they have not been reliable in disclosing stones. If multiple exposures are made at various pressures, stones are much less likely to be overlooked.

We have found this study useful when done postoperatively through an indwelling T-tube. The finding of normal intracavitary pressures and free flow of dye into the duodenum with relatively normal resistance and without evidence of calculi or other obstruction gives one practical assurance that removal of the T-tube will not be followed by fistula or cholangitis. The following two cases are illustrative.

Case 3. A 59-year-old man was admitted on 13 August 1956 with acute cholecystitis of two days' duration. He had had no previous symptoms of gallbladder disease. The acute symptoms subsided rapidly on conservative therapy. He was given clearance by the medical service on the basis of his hypertensive cardiovascular disease secondary to generalized arteriosclerosis. Three efforts at oral and intravenous cholecystography were unsuccessful. Serum bilirubin was 1.8 mg per 100 ml, all of which was direct. An exploratory operation was performed on 31 August and a subacutely inflamed, abscessed gallbladder containing many calculi was removed. The common duct was dilated and explored. No stones were found. A Bakes dilator No. 9 was passed through the sphincter into the duodenum without difficulty. A T-tube was inserted. On 5 September the T-tube was clamped but had to be released because of copious drainage around the tube. On 12 September the patient was taken to the fluoroscopic room where his common duct was studied by radiomanometric technic. Intracavitary pressure was found to be 9 cm of 35 per cent Diodrast. Transit pressure was 15 cm, and at this point dye flowed freely into the duodenum. Residual pressure was consistently 11 cm. Cholangiograms made at this time were negative for calculi. The T-tube was clamped for four days without incident and then removed. No further bile leakage occurred. The wound healed promptly and the patient was discharged shortly in an asymptomatic condition.

Case 4. A 78-year-old man was admitted 17 October 1956 with acute cholecystitis of one day's duration. He had had no previous symptoms of gallbladder disease. He had had several transurethral resections for carcinoma of the prostate and had been on estrogen therapy for several years. Within two days after admission he became clinically jaundiced and his condition deterioriated, making exploration mandatory. A cholecystostomy was performed and four ounces of calculi were removed from the acutely inflamed gallbladder. Without manometric control, dye was injected into the common duct through the cystic duct. No dye entered the duodenum and there was suggestive evidence of common duct calculi. The common duct was opened and two calculi recovered. A T-tube was inserted and again a cholangiogram was done with moderate but unmeasured pressure through a syringe. The common duct was apparently normal, but no dye passed into the duodenum. Because of his precarious condition at this time further surgery was not attempted and

he was returned to his room with a cholecystostomy tube and a common duct T-tube in place. His jaundice cleared and recovery was uneventful. Eleven days after the operation he was taken to the fluoroscopic room and studied by radiomanometric technic. The intracavitary pressure was found to be 5 cm of 35 per cent Diodrast. At 15 cm of pressure the common duct outlined well and dye flowed freely into the duodenum. Residual pressure was consistently between 10 and 11 cm. The biliary tree was clear of calculi. Both tubes were clamped off for six days and then removed. There was no further drainage and cholangitis did not develop. The patient was discharged within a few days without complaint.

Even though the transit and residual pressures were slightly elevated in these two patients, the evidence of free flow through the distal common duct and the several cholangiograms made during the study assure us that the tubes could be removed safely. It is likely that the recency of the acute inflammation and the trauma incident to the surgery explains these slightly elevated readings.

It seems that this technic represents an aid to the surgeon by reassuring him during the operation. It also assures the patient accurate and curative treatment at the proper time.

SUMMARY

The many unsatisfactory results following surgery of the biliary tract indicate that the presently used diagnostic methods are inadequate. The technic of radiomanometrics in which pressure readings and contrast roentgen studies are made simultaneously at the time of surgical intervention has been described. The apparatus, the method, and some of the normal and abnormal findings have been outlined. This technic represents a refinement of simple cholangiography and if routinely used, the incidence of postoperative biliary sequelae should be reduced. It is of great value in elucidating organic, functional, and mixed syndromes of the biliary tree.

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CONFIDENCE

Confidence is an infectious thing—the doctor who possesses it is the doctor who can give it to others. It must be sincere. It is not much use pretending you are sure when you are not—the patient can tell. Confidence is invaluable because if you are certain you are right and if you can convince the patient that you are right, then whether you really are right or not often makes very little difference. Yet the doctor should not assume omniscience. I have a notion that doctors do not often enough say "I do not know." It is better to tell a man confidently that you don't know than to tell him unconvincingly that you do. Patients can appreciate sincerity and truthfulness more than some people realize.

—RICHARD ASHER, M. D.
in *Lancet*
p. 760, Apr. 9, 1955

TREATMENT OF ANTICHOLINESTERASE POISONING BY PHOSPHATE INSECTICIDES AND "NERVE GAS"

STEPHEN KROP, *Ph. D.*
TED A. LOOMIS, *Captain, MC, USAR*

THE advent of potent anticholinesterase compounds as insecticides and the possibility that some member of this broad group of chemicals might be used in war as "nerve gas" present the medical practitioner with an urgent treatment problem in cases of severe poisoning which he otherwise sees only in such emergencies as severe cyanide, carbon monoxide, or aconite poisoning, severance of a major artery, or acute bilateral pneumothorax. Some of these compounds, such as diisopropyl phosphorofluoridate (DFP), tetraethylpyrophosphate (TEPP), paranitrophenyl diethyl thionophosphate (parathion), etc., have a degree of toxicity exceeded by few other known chemicals. They may cause death in a very few minutes after skin or eye contact, ingestion, or inhalation of vapor.[1-6] Since death can occur so rapidly, primary reliance for treatment must obviously be placed on the general medical practitioner whether these agents are used as insecticides or in a chemical attack on the civilian population. Therefore, it may be useful to describe the known major actions of these compounds in order to acquaint physicians with the principles of treatment.

These compounds are, in the main, liquids of high boiling point, having little or no odor and exerting no irritation on the skin, eye, or respiratory tract in liquid or vapor form, thus providing no simple warning of dangerous exposure. Hence, their great toxicity and insidiousness render them highly dangerous.[1-4,7,8]

MODE OF ACTION

The only clearly defined biochemical lesion resulting from the action of these compounds is the long-lasting inactivation of cholinesterases[2-4,9-15] which normally destroy acetylcholine.

From Army Chemical Center, Md.

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The body "neurohormone," acetylcholine, is believed to be intimately associated with impulse formation and propagation in nervous tissue and at the neuromuscular junction, with smooth muscle activity, with secretory activity of many glands, and with the regulation of the cardiovascular system. For convenience in understanding the aims of treatment, the effects of these poisons may therefore be regarded as those of acetylcholine, i. e., stimulation of the "cholinergic" portions of the autonomic nervous system and stimulation and paralysis of the central nervous system and of the neuromuscular apparatus. Acetylcholine effects have also been termed "muscarinic" and "nicotinic." (Other actions of anticholinesterase compounds have been reported,[16] but they probably are not significant from the standpoint of therapy.) From these considerations the actions of these compounds may be deduced or explained.

SYMPTOMATOLOGY

There are considerable variations in relative prominence of groups of symptoms, in time of onset and greatest severity of symptoms, and in time to death, as illustrated by the rapid-acting sarin and TEPP, on the one hand, and the slow-acting parathion, on the other. However, in each case it is possible to regard the symptoms as arising from a common cause and to consider the problem of treatment as fundamentally the same for all members of this class of poisons.

On the basis mainly of observations in animals,[1-4,17-19] the following symptoms can be expected to appear in rapid succession after severe exposure to sarin or TEPP: rhinorrhea, salivation, and miosis; difficulty in breathing followed by cyanosis, collapse, and convulsions; sweating, urination, and defecation; paralysis of respiration with extreme cyanosis. The pulse may be slow or absent and blood pressure low after an initial elevation. Heart block, partial or complete, may accompany the low heart rate, which may persist until death. Widespread or localized twitching of skeletal musculature and subsequent persistent weakness appear. A severe case of anticholinesterase poisoning will present itself as one of acute asphyxia. On the other hand, these symptoms appear and develop more slowly in parathion poisoning.

It is obvious that not all of the symptoms enumerated must be controlled to ensure survival. For example, sweating and miosis will not cause death, but interference with respiration at any point between nostril or mouth and the tissues may be lethal. Hence, this action of the anticholinesterases is the central problem in the treatment of the severely poisoned. The symptoms of primary, lifesaving importance are those arising from the action of these compounds on organ systems whose failure results in

asphyxia. The means by which body tissues are assured of an adequate oxygen supply may be regarded as follows:

1. Those concerned with ventilating the pulmonary alveoli. The anticholinesterases act to increase the resistance of the lung to inflation (bronchoconstriction),[17-20] obstruct the upper airway by secretions,[2-6] interfere with the operation of the respiratory center by convulsions[1,19] and by paralysis,[21,22] and interpose neuromuscular block to the muscles of respiration.[22]

2. Those concerned with delivering oxygenated blood from the lungs to the tissues. In anticholinesterase poisoning propulsion of blood to the tissues is hindered or lost by the slowing or arrest of the heart[5,6,19] and by increased resistance in the pulmonary circuit.[23] Such action may explain acute collapse.

Therefore, the therapeutic challenge is to combat the effects of anoxia. Effective respiration must be maintained, and cardiovascular support must be provided.

TREATMENT

Further absorption of the poison obviously must be prevented by removal of the casualty from the poisoned atmosphere, masking, washing the skin and eye, or gastric lavage—whichever is indicated by circumstances of the exposure. Oropharyngeal secretions must also be cleared. However, in view of the rapidity with which symptoms may become serious, as already indicated, treatment must be instituted without delay.

Drug treatment of anticholinesterase poisoning may logically be approached by (1) chemical destruction or inactivation of the poison already in the body, (2) reactivation of the cholinesterase and destruction of the poison, and/or (3) blocking the effects of acetylcholine. Important progress has been made in the direction of (1) and (2) by study of the action of certain hydroxamic acids in vitro and in vivo.[14,24,25] However, the important element of time is yet to be satisfactorily overcome in these approaches since the hydroxamic acids act too slowly for practical usefulness and, for destruction or inactivation of the poison, must be given prophylactically to be effective.* Blocking the actions of acetylcholine with atropine, however, meets the time requirement for successful treatment, for its action is almost instantaneous after absorption and is of suitable duration. Except for the neuromuscular action of acetylcholine, the actions of the anticholin-

*Similar compounds, such as 2-pyridine aldoxime methiodide (PAM), reported after this paper was submitted for publication, suffer from the same fundamental limitation. In fact, recent observations by one of us (T. A. L.; to be published) indicate that PAM is ineffective as an antidote in experimental sarin poisoning. Therefore, no change in the conclusion of the present paper, that atropine is the backbone of drug therapy of severe anticholinesterase poisoning, is indicated at this time.

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esterases having life-or-death importance are controllable to an important extent by atropine by its known antiacetylcholine action in the central nervous system, smooth muscle, glands, and circulation.[26,27] Similarly, atropine readily prevents or reverses the actions of the anticholinesterases[17-19,27,28] and by itself exerts considerable lifesaving action if given early enough and in sufficient dosage in cases of severe poisoning.[5,6,27,28]

Artificial respiration will be necessary in all cases where respiratory embarrassment or failure exists. Positive pressure ventilation will be needed if the airway resistance is increased. Although atropine in feasible dosage does not affect the neuromuscular block exerted by the anticholinesterase compounds, it makes possible the successful application of artificial respiration by erasing the lung impedance to ventilation, by controlling airway secretions, by relieving the cardiovascular effects, and by controlling convulsions.[19,20,29] It also hastens recovery of the respiratory center[21,22] and spinal reflexes.[16] It should be noted that convulsions will impede artificial respiration and may prevent intravenous therapy.

The toxicity of atropine is low,[30,31] considering its high antiacetylcholine potency, and in severe anticholinesterase poisoning the dosage of atropine may need to be quite high by comparison with doses used for other purposes.[1-6,32] In the past, treatment failures in severe insecticide poisonings have been due to too little atropine given too late. In general, it must be given repeatedly in doses sufficient to control the effects on respiration and circulation or sufficient to maintain a mild degree of overdosage (dryness of the mouth and skin). The initial dose should be 2 mg. of atropine sulfate or tartrate intramuscularly, repeated as the clinical condition indicates. The chief drawback to atropine is its interference with sweating, an important avenue of heat loss from the body; in warm climates this must be carefully observed.[31,33,34] Other drugs possessing the desirable properties of atropine to an improved extent and with greater lifesaving potency are being sought, and some have shown promise,[2-4,16] but their possibilities, all factors considered, are yet to be established. In the meantime, reliance on atropine for drug therapy of anticholinesterase poisoning must continue.

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"Gastrointestinal bleeding may occur following small doses of aspirin, with little or no demonstrable change in the prothrombin concentration of the blood."

—J. J. KELLY, Jr., M. D.
in *American Journal of Medical Sciences*, p. 119, Aug. 1956

PERSONAL IDENTIFICATION BY MEANS OF THE TEETH

ROBERT D. WYCKOFF, *Captain, DC, USN*

THE determination of personal identity is the recognition of an individual by characteristics which distinguish that one person from all others.[1] Fingerprints are considered the best means of identification because they have characteristics in great variety, have individuality, do not change throughout life, and can be accurately recorded.

Although the teeth have individuality and possess a great variety of characteristics that can be accurately recorded, the dental record must be kept up to date if it is to be accurate throughout life, because of changes in the dentition caused by extractions, dental prosthesis, operative dentistry, or accidents. For this reason, and because cases in which fingerprints are not available are relatively few, the teeth have not received popular acclaim as a means of identification. If complete and currently accurate dental records are available, the teeth provide an excellent, and in some cases, the only means of identification. Without an accurate record for comparison, however, the teeth alone become merely clues which may assist in identification only by giving evidence of age and race.

Teeth have been used as a means of establishing identity for several hundred years,[2] but this method is not likely to be used to any great extent in the civilian population unless dental records are made on the entire population and changes that have occurred in the dentition recorded at least once every two years. Ideally, there would be a coding system and the records would be kept on file in a central agency, such as the Federal Bureau of Investigation. The feasibility of such a system is questionable when the number of probable cases is compared with the cost. Although civilian dentists keep accurate records, in many instances they record only the treatments rendered. This, along with the shifting nature of our population, usually results in the non-

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From Dental Division, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

availability of complete records for use by the civilian investigator.

FACTORS ENABLING IDENTIFICATION

There are two principal factors which make the teeth unique as an aid to determining personal identity.[3] The first is the indestructibility of the crowns of the teeth, their supporting bony structures, and the restorative materials that are used by the dental profession. In cases of extreme mutilation by fire, force, or submersion, the teeth often provide the only evidence upon which identification can be made. The enamel of the crowns is approximately 95 per cent mineral; is almost completely resistant to deterioration by air, earth, or water; and is damaged or destroyed only by extremely high heat, exceptionally great mechanical forces, or chemical agents. The materials used in restorative dentistry are even more resistant. Commonly used gold alloys melt in the range of 1,600° to 2,000°F. The porcelain of bridges and artificial dentures is resistant to temperatures up to 2,000°F and the nonprecious metals that are used in the fabrication of partial dentures have even a higher melting point. Without this quality of resistance of the enamel and restorative materials to fire, the identification of many air-crash victims would be impossible.

The second factor which makes the teeth a unique means of identification is the extreme improbability of there ever being two persons with identical sets of teeth. Even in the "perfect" dentition, shape and size of the arch and mold and shade of the teeth, as well as spacing and anatomical imperfections, make identical sets unlikely. On the Navy Dental Record there is a space for remarks that is used to record identifying characteristics other than missing teeth, caries, and restorations. Dental officers are instructed to give special attention to recording the identifying characteristics of the perfect dentition. In most cases, however, the dentitions have missing teeth, caries, and restorations in various combinations, none of which are alike.

RELIABILITY

The unlikelihood of identical dentitions is evident from the number of combinations which are possible with 32 teeth. From the formula 2^n-1 it is found that possible combinations number over four billion. If the five surfaces of each tooth and the possibility of different types of restorations were calculated, the astronomical figure resulting would make it obvious that there is almost no chance of two dentitions being alike and that if the chart of an unknown matches that of a known, even though not completely, there is no doubt that the charts were made from the same dentition (fig. 1).

Identification of an unknown by means of a dental record could be compared to a prediction that he has certain dental characteristics. It is doubtful that one could predict without previous knowledge of his dentition that a certain individual had, for example, a mesio-occlusal amalgam in the lower right second molar in combination with a distal silicate on an upper lateral incisor and a mesio-occlusal amalgam on the upper left second bicuspid. These are three frequently occurring artificial character-

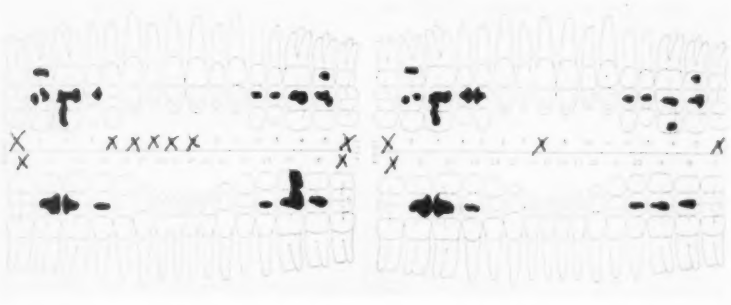

Figure 1. In October 1956 a naval officer was killed when his car went over a 400-foot cliff by the ocean. The car was buried by a landslide, and when it was found after 10 days there was no body in the vicinity. Thirty days later an unidentified body washed up on the beach eight miles from the site of the accident. The chart above (left) was made from the dentition of the body. It was determined by the Navy dental record (right) that the body was that of the missing naval officer. Inasmuch as the officer had access to vital top-secret information, his disappearance had caused concern and a great desire to learn his true fate. (The markings on the dental charts are restorations. X indicates missing teeth.)

istics, but to guess three out of three would be highly improbable, because the number of tooth surface combinations in a complete dentition is equal to 14.35×10^{47}. Therefore if the prediction is made from a dental record that these characteristics should exist and it is subsequently found that they do, the individual is positively identified.

The value of the teeth for determining the personal identity of casualties caused by fire, drowning, and battle has been proved many times in the armed services. Even in peacetime, the hazards of sea and air present a frequent requirement for identification by means of the dental record. This is made easier in the case of military personnel by supporting evidence such as (1) authoritative knowledge of the geographic location of all personnel; (2) daily muster of personnel, making it virtually impossible for the absence of a person to go unnoticed; and (3) information usually available that the casualty to be identified may be a certain person or one of a certain group.

METHOD

Upon entry into the Navy or Marine Corps each person receives a dental examination, and all missing teeth, existing restorations, dental caries, and abnormalities are recorded in duplicate on Standard Form 603—Dental Record. The original record accompanies the individual throughout his career and each dental treatment is entered on his record as it occurs. The duplicate record is sent to the Bureau of Medicine and Surgery in Washington, D.C., where it remains until the member is separated from the service. At that time the original and duplicate records are sent to the Naval Records Management Center, St. Louis, Mo., for permanent filing. The number of records on file in St. Louis is over nine million, and from this source assistance has been rendered to civilian authorities in identifying the unrecognizable remains of persons known to have served in the Navy or Marine Corps (figs. 2 and 3). The permanency of these records is protected—an Act of Congress would be required to have them destroyed.

When the personal identity of Navy or Marine Corps personnel must be determined by means of the teeth, requests for assistance are directed to the Dental Division of the Bureau of Medicine and Surgery. Assistance may be given in several ways, depending upon the requirements of the situation. If the original dental record is not available at the activity or aboard the ship to which the deceased was attached, a record may be made from his teeth and transmitted to the Bureau for comparison with the duplicate record, or else the recordings of the duplicate dental record may be transmitted from the Bureau to the activity or ship. Dental records within the United States can best be transmitted by telephone. When a record is required at an overseas base or aboard a ship it is sent by dispatch; however, where multiple records are required the dispatch becomes so long and cumbersome that errors in transmission may result. Mailing of dental records is seldom satisfactory because identification usually is urgent, to make possible the notification of next of kin and preparation of remains for shipment and burial.

Problems in determination of personal identity have been of the following types:

1. Identification in absence of any supporting evidence.

2. Identification aided by supporting evidence that the remains may be those of a certain individual or of one of a known group.

3. Identification of each unknown in a known group.

4. Verification of identification already made by other means.

When the dental record of a known is compared with that of an unknown, it is not mandatory that the two records match perfectly

in order to establish positive identification. It is mandatory, however, that there be unquestionable points of similarity between the two records with no existing impossibilities, such as restorations on the dental record of the known which do not exist on the record made from the teeth of the unknown casualty. Points

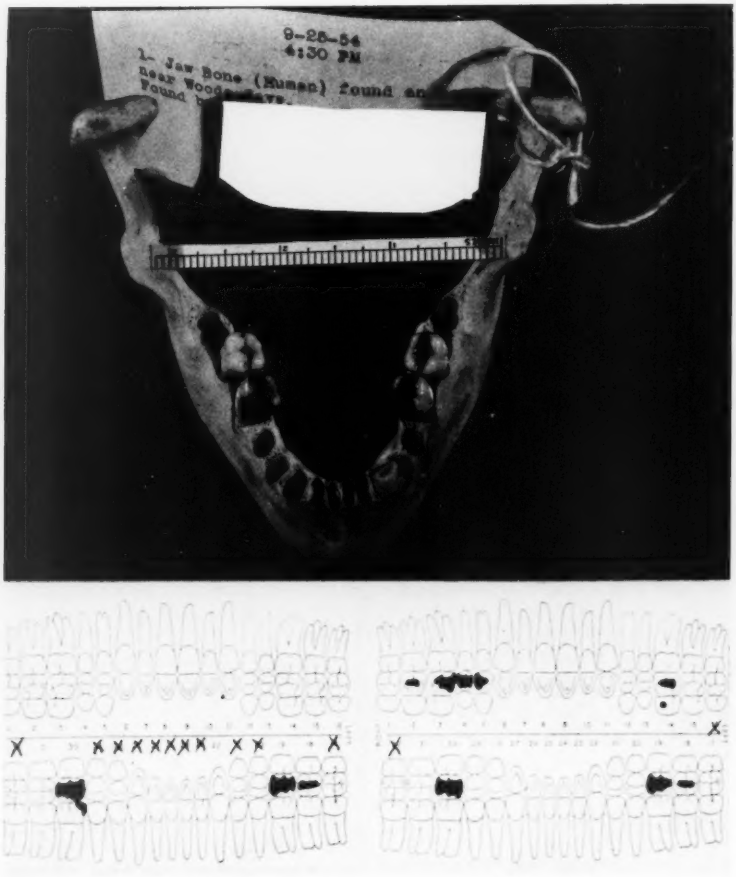

Figure 2. A mandible was found on a California beach in 1954. Police investigation revealed that it could possibly have been that of a man who had drowned in that area a year before. His body had never been found. He had served in the Navy in World War II. A positive identification was made by comparing the mandible with the Navy dental record (right). The chart (left) was made from the mandible. The empty root sockets in the mandible indicated that all teeth had been present at the time of death.

of similarity may be defined as artificial or natural dental characteristics that appear to have been recorded from the same individual.

No set percentage or set number of points of similarity should be required for establishing a positive identification, both because the number of natural and artificial dental characteristics varies and because each characteristic has a relative value based on the average rate of occurrence. Characteristics that rarely occur have greater value in establishing identity than those which occur frequently. By considering frequency of occurrence, the

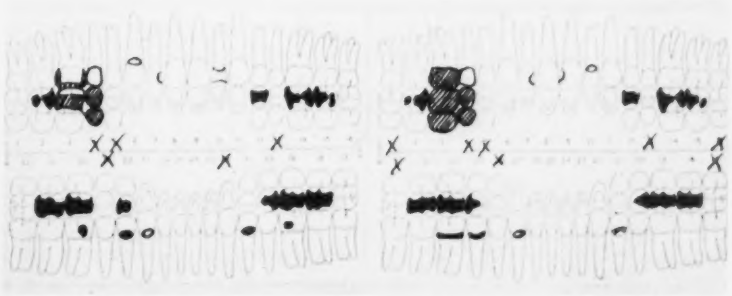

Figure 3. The chart above (left) was made in 1950 from the dentition of a skeleton found in the Mojave Desert. It was not until five years later that a billfold found in the area indicated that the skeleton might have been that of a Marine officer who had been missing since 1947. The dental record (right), made in 1946 when the Marine officer was discharged, was obtained from the Naval Records Management Center and positive identification was made as a result of the comparison.

investigator may be able to establish positive identification, if no impossibilities exist, from a few or perhaps just one rarely occurring characteristic; whereas he would require the combination of several frequently occurring characteristics. For example: Gold restorations provide better evidence than amalgam, missing cuspids than missing first molars, and lingual surface caries than occlusal surface caries.

The final determination as to whether the dental record of the known is also that of the unknown rests on the judgment of the investigator after evaluating the dental evidence at hand. In the Navy and Marine Corps where reasonably accurate records are available, experience has shown that when the record of the known is compared with that made from the unknown there is seldom any doubt. In almost all cases the record either matches or does not match.

DISCUSSION

The importance of identification of the dead cannot be overemphasized. Establishment of personal identity is not only a passive sort of comfort to the next of kin but often is a requirement in the settlement of legal entanglements. Because cases that require identification by means of the teeth are relatively few, there is no organized body of dental experts in this field, nor are there any persons who spend full time in the science of forensic dentistry. It is, however, within the capability of all dentists to assist in the identification of the dead when teeth are involved. The determination of personal identity by means of the teeth, therefore, is a service to the other forensic sciences that may be rendered by the dental profession.

SUMMARY

Complete and accurate dental records provide an excellent and sometimes the sole means of identifying the remains of active-duty military personnel and of civilians who have had previous military service.

Two factors make it possible to use the teeth for this purpose: (1) The crowns of the teeth, their supporting bony structures, and the restorative materials used by the dental profession are almost indestructible; and (2) there is little chance of there ever being two persons with identical sets of teeth.

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ENURESIS AND SPINA BIFIDA OCCULTA

SHELTON P. SANFORD, *Captain, MC, USN*
GILBERT W. KLIMAN, *Lieutenant, MC, USNR*

TOILET training and toilet habits are a source of varied pleasure and pain. Psychoanalytic studies reveal that much of our aggression, guilt, shame, and disgust, as well as happiness, are firmly associated with our toilet experiences. In such an area, one must expect that medical judgment will be difficult. Any objective contribution to our understanding of toilet habits will be especially valuable, since objectivity will be difficult to obtain except through unusual self-knowledge or carefully designed experiment. The following article is a mundane matter of the latter sort: a study of the frequency with which an occult vertebral defect appears among enuretic patients and controls.

A satisfactory working definition of "enuresis" is "frequent urinary incontinence past the age of five, occurring primarily at night." Some definitions require the patient only to wet his bed past his third birthday, and still other definitions include daytime incontinence. Some authors require a frequency minimum of one episode of urinary incontinence per week. For practical purposes, such differences in definition are of little consequence in the area where enuresis is most frequently a large-scale problem: military recruit selection. Our experience with enuresis was gained while observing patients in recruit status at this training center. Here, 0.3 per cent of all incoming recruits are discharged each year with the diagnosis "Immaturity reaction with symptomatic habit formation: enuresis." The occurrence of bedwetting even once or twice a month is enough to cause serious personal handicap to a recruit in the compulsively cleanliness-conscious environment of a barrack or crew's quarters. As the diagnosis implies, an enuretic recruit is considered to suffer a personality disorder of which enuresis is only one symptom.

Studies of enuresis have been in two directions. Students of physiologic and anatomic orientation have sought electroencephalographic abnormalities,[1] urethral valve disorders, cystitis, and spina bifida occulta as causes. Students of personality disorder

From U. S. Naval Training Center, Bainbridge, Md.

have generally expanded on Freud's concept that enuresis is a masturbation equivalent. Among the enuretic patients of military age, little support has been found for the etiologic importance of anatomic defects. Much work has, however, supported the psychologic viewpoint[2]—both by eliciting evidence of personality disorder among these patients and by either curing or decreasing the severity of the condition with psychotherapy.

The present study was undertaken in a spirit of wishing to do some justice to the anatomic approach at a time when personality studies have been greatly emphasized. One of us had long suspected that spina bifida occulta might frequently cause enuresis. This suspicion was a natural one. Enuresis is certainly a prominent difficulty for patients with *manifest* spina bifida, particularly where other neurologic defects appear. Ingraham and Lowrey,[3] reported that 7 of 65 children with spina bifida occulta were seen initially with complaints of "enuresis or other form of incontinence." Their surgical exploration of patients with spina bifida occulta and associated symptoms often disclosed a definite occult meningocele, or a fibrous tract attached to the meninges, or a lipoma within the gaping vertebral canal. Such associated abnormalities provide a mechanical explanation for neurologic symptoms that were seen in the patients studied.

Symptom-producing abnormalities may lurk beneath an apparently innocuous and occult vertebral defect. Craig and Mulder[4] reported the case of a 12-year-old girl in whom severe neurologic symptoms were produced by a large fat pad which compressed the dura beneath a maldeveloped fourth lumbar spinous process. In addition, the filum terminale was attached to the dura opposite the fourth lumbar vertebra, exerting traction on the conus medullaris. Jelsma and Ploetner[5] found 48 out of a group of approximately 6,000 cases of low-back pain, in which they thought the pain was produced by spina bifida occulta. Such cases suggest that a disproportionate growth of the vertebral column might exert traction on the lower spinal cord by means of a fibrous tract between the cord and a vertebral defect. They provoke serious consideration of how often such abnormalities might occur in routinely observed and even asymptomatic cases of spina bifida occulta.

Evidence for relationship between occult spinal bifida and enuresis is uncertain. A pioneering study of military recruits was made prior to World War I by Fuchs[6] who reported a syndrome *(Myelodysplasie)* consisting of enuresis, lumbosacral superficial anomaly, and roentgenographic evidence of spina bifida occulta. It was not until 1927 that a scientifically satisfactory study of enuresis and spina bifida occulta was made. This work, by West,[7]

detracted much from previous anatomic and roentgenographic studies. He found no statistical relationship at all! Principal difficulties in reports on this subject are lack of properly selected control cases and lack of stated criteria for identifying spina bifida occulta on roentgenograms. These difficulties seem adequate to account for lack of agreement as to the incidence of spina bifida occulta among the general population and among enuretic patients. An example of a recent work which is difficult to evaluate, because it lacks controls, is Ferulano and Jannelli's[6] study of 15 enuretic patients with spina bifida occulta. From their study, one can make no estimate of the frequency with which the spinal defect occurs in a comparable group of the nonenuretic population, and no estimate of the frequency of the defect among the general population of enuretic patients. The range of disagreement in the literature is well illustrated in table 1.

TABLE 1. *Spina bifida occulta*

Subjects studied by:	Number of cases	Lumbar or sacral defect (per cent)	Lumbar defect (per cent)	Sacral defect (per cent)
Southworth & Bersack[9]	550	18.2	2.2	16.0
Hadley[10]	1,500	5.2	0.2	5.0
Brailsford[11]	3,000	17.0	6.0	11.0
Sutherland[12]	12,000	5.0	1.5	3.5
Wheeler[13]	1,000	36.0	23.0	13.0
West[7]	100	48.0		
Enuretics studied by:				
West	81	51.6		
Mertz[14]	32	68.0		
Karlin[15]	25	84.0		

Of the studies listed in table 1, the best is the previously mentioned 1927 study of British recruits by West. West used 100 randomly selected controls and 100 enuretic patients, and also graded spina bifida occulta according to five degrees of severity. He found no difference in the incidence of spina bifida occulta among the two groups. In addition, he found that his control cases actually had a greater incidence of the three most severe degrees of spina bifida occulta! Working from a different direction, Emmett,

Simon, and Mills[16] also cast doubt on the relevance of spina bifida occulta to enuresis. They sought histories of enuresis among 53 children with proven spina bifida occulta, in whom there was not only roentgenographic evidence of spina bifida occulta but also one or more of the following: "Sensory changes in the saddle area and lower extremities, motor changes in the perineum and lower extremities, . . . clubfoot or other associated congenital anomalies." *None* of the patients with spina bifida occulta as defined above was found to be enuretic.

METHOD

Roentgenograms were taken of 196 consecutive enuretic patients seen in the neuropsychiatric unit of this training center. All patients were recruits in the first weeks of recruit training. Their complaint of current enuresis was generally substantiated by observations from their company commander and by the neuropsychiatric unit corpsmen, as well as by past history. By arbitrarily selecting every seventh recruit arriving at the "receiving unit," 181 controls were obtained. No attempt was made to establish how many of the presumably normal controls were actually enuretic. A separate study, however, revealed that only one of 172 incoming recruits was currently enuretic. All roentgenograms were "routine" anteroposterior lumbosacral views which usually included the lower thoracic, all lumbar, and at least the first two sacral vertebrae. Because of this limitation, no reference will be made to spina bifida occulta below the second sacral vertebra. A reading of "spina bifida occulta" was made whenever a *complete* lack of dorsal or ventral fusion of a vertebral arch was noted. Simple absence of a spinous process was not called spina bifida. Partial fusion defects were not included. Any complete nonfusion was considered a spina bifida, no matter how small the distance between the unfused portions. Interpretation of each film was made separately by three physicians, each unaware of the interpretations of the others. Films were read in such fashion that the interpreter was generally unaware of the identity of the case—whether enuretic or control. Despite the separation and "blindness" deliberately inherent in the study there was disagreement concerning only two of the 277 roentgenograms studied.

RESULTS

An outline of our results is present in table 2. In the control group, 57 cases of spina bifida occulta were discovered on the anteroposterior lumbosacral roentgenograms. Among the enuretic subjects, 60 cases were discovered. No significant difference was found in the distribution, extent, or frequency of spina bifida occulta in the two groups. If any differences were suggested by

the data, such differences were in the direction of greater spinal abnormalities in the "normal" control group. That is, there were two thoracic defects among the controls and each involved three vertebrae. No thoracic defects at all were found among the enuretic subjects. In addition, there was a somewhat higher incidence of lumbar defects among the controls than among the enuretic subjects. There can be no doubt that the over-all incidence of spina bifida occulta in the two groups studied is statistically identical. Furthermore, there is no statistical difference in the distribution of defects among the two groups. The small preponderance of thoracic and lumbar defects among controls is attributable to random variations. The findings of Karlin[15] and Mertz[14] have thus not been substantiated by our study of the relationship between enuresis and spina bifida occulta.

TABLE 2. *Spina bifida occulta among enuretic naval recruits (controls, 181 cases; enuretics, 196 cases)*

Defect	Controls (per cent)	Enuretics (per cent)
Spina bifida occulta	31	31
Thoracic	1*	0
Lumbar	2*	1
Sacral (S1 or S2)	30	30

*One case with a thoracic defect also had a lumbar defect. Another case with a thoracic defect had a sacral defect and a lumbar defect. One case had combined lumbar and sacral defects (L5, S1) without a thoracic defect. There is an overlapping of percentages because of combined defects.

DISCUSSION AND CONCLUSIONS

We have been unable to support a hypothesis that enuresis has a strong association with spina bifida occulta. A lack of statistical correlation does not exclude another possibility. It may still be that some enuretics with spina bifida occulta would reveal spinal cord lesions if surgically explored. Such was the experience of Ingraham and Lowrey when operating on a group of patients with various neurologic difficulties occurring in association with spina bifida occulta. On the other hand, our results tend to dismiss rather than raise hope for discovering abnormalities of the cord as a frequent cause for enuresis among the young adults studied. We conclude that other causes will be more rewardingly studied.

SUMMARY

The literature indicates that a positive relationship exists between enuresis and spina bifida occulta. However, past studies have suffered from lack of precise definition and rigorous control groups. Our study compared the incidence of spina bifida occulta among enuretic naval recruits with the incidence among randomly selected control recruits. Anteroposterior lumbosacral roentgenograms were made on both groups and evaluated by three physicians. Diagnosis of spina bifida occulta was made in any case which had a complete nonfusion of a vertebra. Evaluation was made "blindly" without knowledge of whether the roentgenogram was of a patient or a control. Evaluators also had no knowledge of each other's findings. This study revealed no difference in the incidence of spina bifida occulta among enuretic and control recruits. The extent and distribution of bifid defects in the two groups were also not significantly different.

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MODIFIED MARSUPIALIZATION OPERATION FOR PILONIDAL SINUS

An Ambulatory Treatment Using Lidocaine as a Local Anesthesia

DANIEL J. ABRAMSON, *M. D.*

PILONIDAL cysts and sinuses in early adult life produce symptoms of irritation, soreness, persistent discharge, or abscess formation. Pilonidal disease presents a great problem to the armed services, and a tremendous number of man-days are lost because of this condition. Casberg[1] found that about 80,000 such patients were admitted to Army hospitals during the years 1941 through 1945, with an average hospital stay of 55 days for those surgically treated by excision procedures.

The marsupialization operation, or exteriorization of the sac wall for treatment of pilonidal sinuses, was described by Buie[2] in 1937. In 1950, I developed an exteriorization procedure in which the lateral walls of the sinus were excised and the remaining sac was marsupialized. The merits of this technic have recently been discussed by Phelan.[3] Seventy-three unselected patients treated by this technic have been reported previously.[4] In the present study of an additional 109 patients, 32 were treated by the same method.

Since the exteriorized sac wall is quickly obliterated by healthy granulations, several adjunctive procedures were tried in an effort to shorten the healing time. These consisted of secondary closure with wire in 11 patients, and pinch grafting in three. The results, however, were not superior to the procedure finally adopted in the last 63 patients, in which all the sac wall was excised except for a small midline strip measuring one-fourth inch or less in width. All of these procedures were performed in the outpatient surgical department of this hospital. Local field block anesthesia was used, and operations were performed as an in-and-out procedure.

Following operation, the patients are placed on quarters for from three to five days and on limited duty for three weeks, and

From Walter Reed Army Hospital, Washington 12, D. C. Dr. Abramson is also on the Surgical Staff of Georgetown University Hospital, Washington, D. C.

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then returned to full duty. Since hospitalization is not required and patients are returned to duty quickly, there has been an attendant monetary benefit to the Army and a minimal loss of man-days by the use of this technic. The simplified marsupialization operation is applicable to all types of pilonidal sinus. The healing time is short, the morbidity minimal, and the results excellent.

TECHNIC

An oral antihistaminic is given prior to operation, and the patient is placed on the operating table in a modified jackknife position. The buttocks and sacral region are shaved and separated by adhesive traction. The area is prepared for operation with suitable antiseptics. Anesthesia is accomplished by peripheral field block using a 1 per cent solution of lidocaine hydrochloride with epinephrine. The deeper tissues are infiltrated with the anesthetic agent—it is unnecessary to inject the skin. Anesthesia is rapid, long lasting, and extremely effective because of the diffusion properties of lidocaine hydrochloride.

A grooved director, or mosquito clamp, is inserted into the sinus opening, and the skin overlying the instrument is incised (fig. 1). It is important to open superiorly and inferiorly into normal tissue. All hair and infected granulation tissue is removed by wiping with a gauze pad. The wound is then probed for addi-

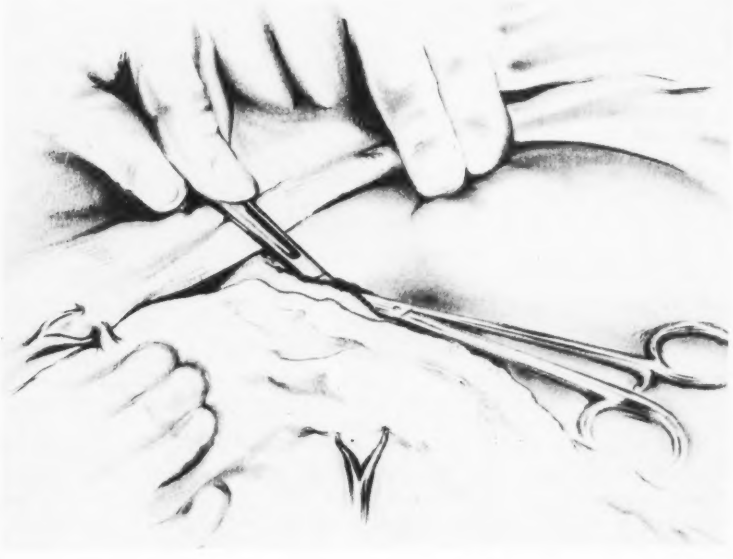

Figure 1. The sinus tract is opened over a mosquito forceps (or grooved director).

tional openings, and any accessory tracts are opened throughout their extent.

The skin adjacent to the sac is circumcised and the skin lateral to this is undermined. An incision is made near the midline in order to outline the amount of the sac wall to be removed. Allis forceps are applied to the circumcised skin edge and adjacent sac. By sharp dissection (fig. 2) the sac wall is removed and the underlying fascia exposed. A careful search is again made for additional openings.

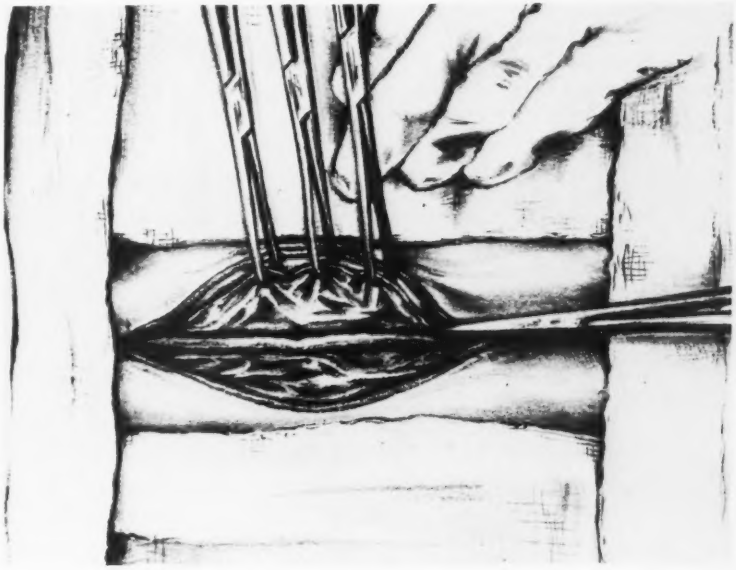

Figure 2. The surrounding skin edge is circumcised. The lateral skin edge has been undercut. Allis forceps are applied to edge of sac wall and circumcised skin. An incision has been made near the midline of sac, and the sac wall is excised by sharp dissection. Following this a similar procedure is carried out on the opposite side—approximately one-fourth inch of sac is left in situ.

The skin edge is sutured to the edge of the remaining sac with interrupted chromic No. 00 catgut sutures, a bite being taken in the deeper tissues. The sutures are left long to facilitate their later removal. The procedure is repeated on the opposite side, and when the operation is completed approximately one-fourth inch of sac remains (fig. 3). When the sinus tracts are small and ill-defined, the entire area is excised and the skin is sewn to the underlying tissues or presacral fascia. An antibiotic ointment and pressure dressing are applied, but no other antibiotic therapy is given. Aspirin with codeine is prescribed when necessary. The

patient is then placed on quarters for from three to five days, and after three weeks of limited duty he is returned to full duty.

The postoperative care is simple but is as important as the operative procedure itself. It is essential to stress that healing must occur from the base and that each patient must be followed until healing is complete. The patient returns on the second day for redressing and usually volunteers the information that pain was negligible. The sutures are removed on the seventh day, and Sitz baths or hot compresses are begun. He is seen and redressed

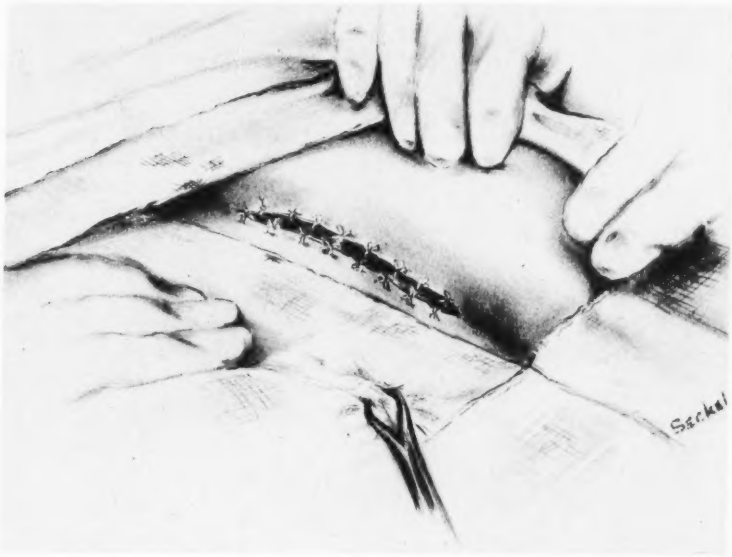

Figure 3. The skin edge is sutured to the remaining sac wall with interrupted chromic catgut.

about every five to seven days thereafter. The intervening dressings are done by the patient. At each dressing the wound is cleansed and rubbed gently with cotton applicator sticks. It is important to keep the surrounding area shaved in order to prevent growth of hair into the wound. The sac wall is soon covered with healthy granulation tissues. Exuberant granulations are cauterized with silver nitrate. Complete healing occurs in about three weeks.

COMMENT

A history of prolonged periods of drainage, abscesses, or recurrences was characteristic of the majority of the cases. In this present series of 109 cases there were 14 acute abscesses that required incision and drainage prior to marsupialization. In a total

of 39 patients the following surgical procedures had been carried out earlier: incision and drainage in 26, excision and primary closure in 6, and excision and open packing in 7. At operation, multiple or complicated tracts were found in 56 patients and a simple or single cavity in 53.

In the previously reported series the average healing time was 29.3 days. The technic at that time consisted of removing most of the lateral sac wall. The same method was performed in the first 32 patients of the present series with an average healing time of 25.8 days. Since granulation tissue quickly obliterates the lining of the sac, several adjunctive procedures were tried. After routine marsupialization, through-and-through stainless steel sutures were inserted. These sutures were tightened about a week after operation. The time of healing in 11 patients averaged 24 days. Another technic tried was marsupialization and immediate pinch grafting. The healing time in three such patients was 22 days. It was concluded that these adjunctive procedures had no advantage over the technic finally adopted in 1954 in which all the sac except one-fourth inch was removed. The average healing time in 63 patients was 23.6 days. One patient in this last group had a healing time of 85 days, and one other, 124 days. Had these two cases of prolonged healing been excluded, the average healing time would have been 21 days. In both of these patients there was a small unhealed area near the anus which finally was closed with wire sutures. Delayed healing was probably caused by proximity of the wound to the anus, repeated trauma to the area, and the obesity of the patient.

The postoperative course is usually uneventful. Pain and discomfort is minimal and healing occurs rapidly.

After complete healing had occurred, one patient developed an adhesive-tape dermatitis followed by severe generalized furunculosis involving the buttocks and the scar. Another patient developed maceration of a superficial wide scar because of obesity, excessive moisture, and lack of personal cleanliness. A rather unusual situation in which the entire wound split open occurred one year after operation in one patient and shortly after operation in another. These will be classified as recurrences despite the fact that there was no evidence of sac or sinus tract. It was believed that local trauma or spreading of the buttocks might have contributed to this phenomenon, and in one patient a factitial element was suspected. The latter patient was transferred to another station before complete healing occurred. The other patient was healed by simple, routine measures.

DISCUSSION

The exteriorization or marsupialization procedure removes some of the shortcomings of primary closure technics, such as the fre-

quent failure of primary union, the high rate of recurrence, and the prolonged constipating bed-rest regimens. Excision and open packing procedures have the disadvantage of a prolonged healing time, averaging three to four months, and the attendant discomfort of frequent dressings. The advantages of the modified marsupialization or exteriorization procedure may be listed as follows: (1) The procedure has universal applicability despite the size of the cyst, number of extensions, recurrences, or all other complications. (2) Local anesthesia is used for the procedure with a minimal loss of tissue and with adequate visualization of accessory tracts. (3) The morbidity is minimal. (4) The patients are ambulatory and almost unrestricted activity is permitted. (5) The patients are able to return to duty quickly and thus replacement is unnecessary. (6) The recurrence rate is low. (7) The scar is well healed, pliable, and nontender, and the intergluteal contour is preserved.

The modified marsupialization or exteriorization procedure for treatment of pilonidal sinuses has been performed on a total of 182 patients in the outpatient department of this hospital. The first 73 cases have been previously reported. In the last 63 cases, the healing time has been shortened to 23.6 days by leaving in situ only a small strip of the sac wall to which the skin is sewn. This series is the largest reported in which such an operation is carried out as an *outpatient procedure using local anesthesia and with the patient ambulatory*. This outpatient procedure has released hospital beds urgently needed for the treatment of more serious conditions. From the standpoint of cost and the number of man-days saved, it has benefited the government tremendously.

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CAVITY PREPARATION BY ULTRASONIC VERSUS ROTARY INSTRUMENTATION

In Vitro Cutting Effectiveness and Heat Production

JACK L. HARTLEY, *Major, USAF (DC)*

DURING recent years considerable research has been directed toward the evaluation of new devices and technics for the removal of tooth structure. These innovations have been based primarily upon the fact that a higher rotation rate produces increased operating efficiency.[1-3] As rotational rate increases, there is an associated marked reduction in the amount of pressure necessary for cavity preparation and an increase in vibration frequency that results in a procedure less objectionable to the patient.[4-6] Higher rotational speeds produce temperature elevations that should be counterbalanced by cooling sprays of water and air directed within the operational field.[7-9] Although investigators have pointed out the advantages of the high-speed technics, many operators persist in using the time-tested, low rotational speeds. In most instances this is due either to personal preference based upon a long period of satisfactory accomplishment with this technic or to the fact that some patients have found higher speeds objectionable.

A comparatively recent development in the field of operative dentistry instrumentation utilizes ultrasonic vibration, along with an abrasive slurry of aluminum oxide, for the removal of enamel and dentin. Reports in the literature cite that little pressure is required and that the very high frequency of vibration results in excellent patient tolerance; pupal damage appears to be no greater than that caused by conventional rotary instrumentation.[10-13] Evaluation of newer devices and technics by the U. S. Air Force Dental Service has been carried out and is continuing at the National Bureau of Standards and at this school, in an effort to determine operative technics and equipment which will remove tooth structure with a maximum of effectiveness and a minimum of objectionable sequelae.

From Air University School of Aviation Medicine, United States Air Force, Randolph Air Force Base, Tex.

This study was designed to compare in vitro cutting effectiveness of rotating instruments at 400 r.p.m., at 12,000 r.p.m., and an ultrasonic instrument with a frequency of 29,000 cycles per second. Simultaneous temperature measurements of the pulp chamber were accomplished throughout the experiment.

METHODS

Three basic instruments were employed in this investigation:

1. A conventional dental engine modified by speed-reduction pulley to produce a maximum bur speed of 400 revolutions per minute. This high-torque instrument could not be stalled by normal methods. Conventional burs produced good cutting effectiveness but the life of the bur was exceedingly brief owing to the comparatively heavy pressures necessary for cavity preparation.

2. A dental engine fitted with a high-speed pulley which produced a maximum of 12,000 r.p.m. at the bur. This speed was selected because burs of current design produce their most effective results at this rate.[2]

3. An ultrasonic dental instrument.*

The time required for cavity preparation was recorded by an electronic switch and chronometer mechanism, designed for use with any of the three instruments. The timing mechanism was energized by pressure upon the foot control of the instrument under test, thus recording only the actual cutting time.

Temperature recordings were accomplished by means of copper-constantan No. 32-gage thermocouples which activated a multiple-channel recording potentiometer. One thermocouple was placed directly into the pulp chamber of the extracted human tooth while another was placed so as to record the room temperature immediately adjacent to the operative area. Pulp chamber temperature elevations above ambient readings were recorded.

PROCEDURE

Sound human teeth which had been extracted for prosthetic purposes or by reason of periodontal involvement were placed immediately in a Deepfreeze. It was postulated that this rapid freezing would best preserve the hard and soft tissues until a sufficient number of sound teeth were collected for an experiment of this magnitude. While still frozen, the teeth were mounted in artificial stone in the conventional mandibular and maxillary arch forms.

A total of 150 cavity preparations were accomplished in the following manner: For each of the three methods (*i. e.*, low speed,

*The Cavitron, purchased from the Cavitron Equipment Corporation, Long Island City, N. Y., New York.

high speed, and ultrasonic) 10 Class I cavities were prepared in the biscuspid teeth and 10 Class I in the molar teeth. Ten Class V cavities were prepared in the anterior teeth, 10 in the bicuspids, and 10 in the molar teeth. The teeth selected were basically sound in that they did not contain carious areas greater than the early involvement of pits and fissures. Variations in the operational technics were minimized by adherence to the following factors:

1. All procedures were accomplished by the same operator.

2. Preparations were standardized in outline form for each type of tooth.

3. Depth of cavity was controlled by the principles of correct resistance and retention form.

4. The operative technic was accomplished as nearly as possible as though for an actual case.

5. A cooling spray of water and air was employed while cutting at 12,000 r.p.m.

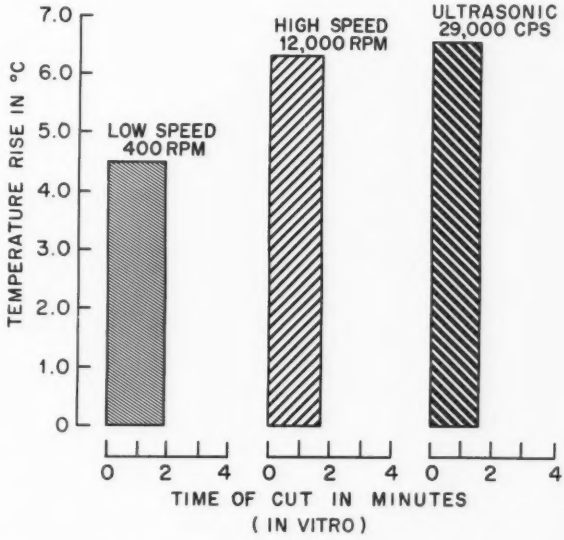

Figure 1. Comparison of heat production and actual time of cutting by the three technics in Class I cavity preparations, bicuspid teeth.

RESULTS

Table 1 summarizes the results of the experiment. All three methods of instrumentation are plotted in bar graph form for each type of tooth and cavity preparation (figs. 1-5). The peak tem-

TABLE 1

Time of cavity preparation in minutes

Method	Anteriors		Bicuspids				Molars			
	Class V		Class I		Class V		Class I		Class V	
	Average	Range	Average	Range	Average	Range	Average	Range	Average	Range
Low speed (400 r.p.m. rotary)	2.3	1.3-3.9	1.9	1.4-2.4	2.6	2.0-2.8	3.2	2.6-3.8	2.3	1.9-2.5
High speed (12,000 r.p.m. rotary)	1.7	1.5-1.9	1.6	1.4-2.9	1.7	0.9-1.9	3.5	2.9-4.5	2.5	2.2-3.5
Ultrasonic	2.4	1.2-4.4	1.6	1.1-2.1	1.7	1.1-1.9	2.9	2.0-3.8	2.3	2.1-3.2

Temperature rise above ambient in degrees centigrade

Method	Anteriors		Bicuspids				Molars			
	Class V		Class I		Class V		Class I		Class V	
	Average	Range	Average	Range	Average	Range	Average	Range	Average	Range
Low speed (400 r.p.m. rotary)	2.5	2.0-3.0	4.8	2.5-8.0	2.6	2.0-4.0	3.8	2.0-6.0	4.8	3.9-5.5
High speed (12,000 r.p.m. rotary)	10.0	8.0-12.0	6.3	4.0-8.0	3.9	3.5-4.7	6.6	5.0-9.0	4.7	3.5-6.0
Ultrasonic	3.5	3.0-4.0	6.5	5.0-8.0	3.5	3.0-4.0	1.9	1.0-3.0	1.8	1.0-4.0

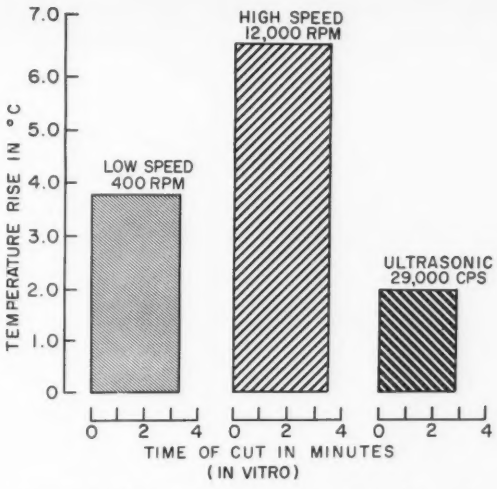

Figure 2. Class I cavity preparations, molar teeth.

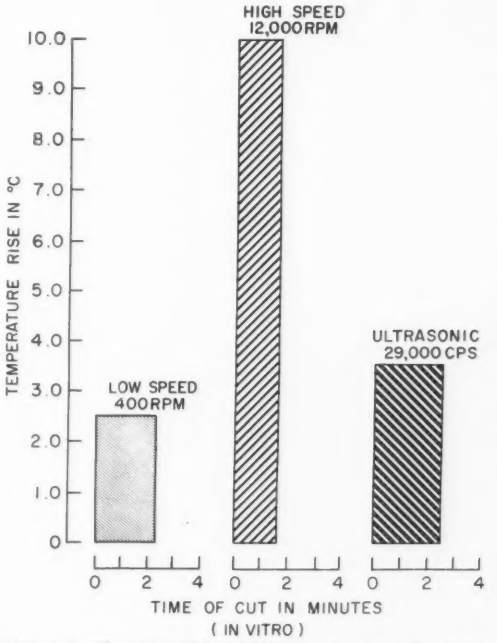

Figure 3. Class V cavity preparations, anterior teeth.

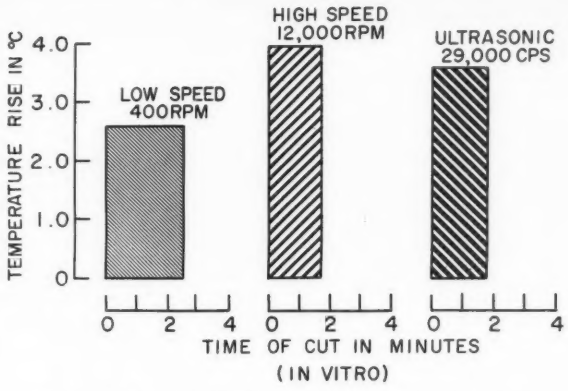

Figure 4. Class V cavity preparations, bicuspid teeth.

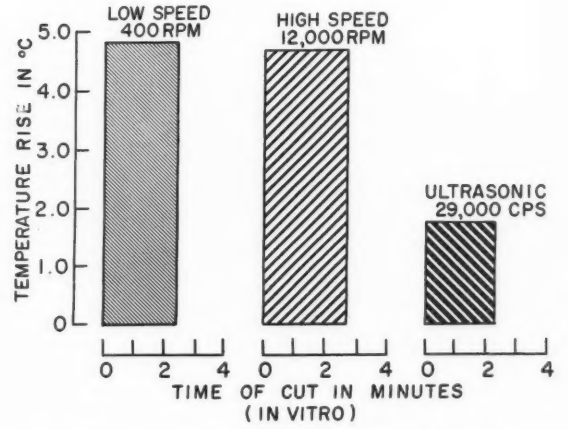

Figure 5. Class V cavity preparations, molar teeth.

perature rise above ambient appears on the vertical axis. Total cutting time for each type of preparation appears on the horizontal axis.

DISCUSSION

Different working pressures and methods of procedure were necessary in cavity preparation with the three technics tested. The low-speed, high-torque procedure, very similar to hand instrumentation, required a very heavy pressure that frequently led to hand fatigue. Initial penetration of healthy enamel was difficult. The amplitude of vibration appeared very high. The basic

frequency was calculated to be below the range of 100 to 200 c.p.s. determined by Walsh and Symmons[6] to produce the most unpleasant sensation. (Revolutions per minute × number of blades ÷ 60 = basic frequency of vibration exclusive of the effects of the handpiece and belt.)

High-speed instrumentation resulted in a marked reduction in hand fatigue because a much lighter hand pressure was required. Difficulty was experienced in controlling the instrument during the initial phases of cavity preparation due to the "climbing" tendency manifest when healthy enamel was encountered. Although diamond instrumentation would be far more suitable for this phase of cavity preparation, this study did not include the use of diamonds in an effort to evaluate the operating time of cutting without the diamond instrument as a basis for further studies.

An annoying, high-pitched whine was audible while operating at 12,000 r.p.m. The cooling spray exerted a muffling effect upon the noise and functioned effectively in providing improved visibility by removing debris from the operative field. Preliminary studies carried out without the spray, but with a stream of air directed upon the dry tooth, indicate that the air stream provides maximal visibility during the removal of tooth structure; however, maximal cooling is achieved by a water-air spray.[4,8]

Utilization of ultrasonic instrumentation required no specific additional training, but, optimal operating efficiency could not be attained until the operator developed proficiency in the exertion of an exceedingly light hand pressure. Purposeful, but not excessive heavy hand pressure was applied to test the effects thereof. The cutting effectiveness was markedly diminished, and the heat produced at the cutting tip was so intense that a brown-black burn was produced in the dentin.

Visibility was very poor with the ultrasonic instrument. The abrasive slurry rapidly filled the cavity and obliterated the operative area. As a consequence, frequent water flushes had to be carried out during the cutting procedure.

Two objectionable effects resulted from rapid wear of the cutting tip: (1) Minute particles of metal, abraded from the tip, darkened the slurry and reduced visibility even further; and (2) rounded edges of the worn tip precluded the formation of sharp line and point angles.

To produce these requisites of proper cavity preparation, a new cutting tip had to be inserted. Changing the cutting tip was a time-consuming procedure which required the following steps:

1. The worn tip was unscrewed.

2. The threads within the handpiece were cleaned by dipping the end of the handpiece into 70 per cent alcohol and retuning so as to produce resonance while in the alcohol.

3. The threads were then blown dry.

4. After the new tip was screwed into place, the handpiece was retuned.

During the latter part of the experiment it was found that the tip could be reshaped by grinding with a rotary hand instrument sharpener. This procedure was entirely satisfactory and reduced the time lost considerably. Although the tuning procedure was not difficult, the time involved in reshaping or changing the tips of the ultrasonic instrument exceeded that necessary to exchange burs in the conventional handpiece.

Considerable difficulty was encountered in maintaining control of the ultrasonic handpiece because of an unbalanced weight distribution. The absence of rotational torque completely obviated any "walking" tendencies, but the weight exerted on the handpiece by the attached heavy tubing made it difficult to control the handpiece during precision cutting procedures. It was necessary to observe stringent precautions to assure the removal of only the desired areas. More exact control of the handpiece could be maintained if a semiflexible upright support were attached to the top of the machine console to bear the weight of the tubing.

The actual time involved in cutting procedures, when the ultrasonic instrument was used in cavity preparation, compared favorably with the two rotary procedures. However, the over-all time required for cavity preparation—including tuning the handpiece, changing tips, and flushing the operative field—was somewhat greater than that required in the conventional technics. Data on this phase of the evaluation are not presented because to be of value they should include results of actual clinical studies after further familiarization with the instrument.

SUMMARY

Temperatures produced within the pulp chambers of anterior, bicuspid, and molar teeth, when cavities were prepared by low-speed, high-speed, and ultrasonic instrumentation, ranged from a minimum average temperature rise of 1.9°C in molars following ultrasonic preparation to a maximum average rise of 10.0°C in anteriors prepared by high-speed rotary instrument technic.

The possibility of heat damage to the pulp during ultrasonic instrumentation properly employed appears to be no greater than with conventional rotary instrumentation.

The average time required to prepare anterior Class V cavities with low-speed instrumentation was 2.3 minutes. Class V cavities

in the bicuspids and molars required an average of 2.4 minutes at 400 r.p.m. Class I cavities in the bicuspids and molars required an average of 2.5 minutes.

High-speed instrumentation required an average of 1.7 minutes to cut Class V cavities in the anterior teeth. The bicuspid and molar teeth required an average of 2.0 minutes for the preparation of Class V cavities at 12,000 r.p.m. Class I cavities in the bicuspids and molars required an average of 2.5 minutes at the high speed.

Ultrasonic cutting with the abrasive slurry averaged 2.4 minutes for Class V preparations in the anterior teeth and 2.0 minutes for Class V preparation in bicuspids and molars. Class I cavities required an average of 2.2 minutes for preparation of bicuspids and molars by the ultrasonic technic.

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REACTIONS TO PROPHYLACTICALLY ADMINISTERED PENICILLIN

A Study of Sixty-Eight Hospitalized Patients

KENNETH H. BURDICK, *Captain, USAF (MC)*

IN RECENT years, many articles reporting allergic reactions to penicillin have appeared.[1-4] Unfortunately, many of these reports deal with persons receiving penicillin therapeutically for various diseases, and the clinical picture and reported laboratory findings of the allergic reactions have been modified by these illnesses. In a recent attempt to abate an epidemic of streptococcal disease at this installation, the entire military population, with the exception of those persons on leave or those suspected of being allergic to penicillin, were given prophylactic penicillin. This study deals only with those persons requiring hospitalization for severe reactions of an allergic nature, in whom reactions from other drugs, foods, or illness were excluded by history and by physical examination, and whose reactions were believed to be caused by penicillin. The scope of this article has been limited to an attempt to correlate the clinical picture with the changes in common laboratory results and to relate these to the number of days of hospitalization and the length of the incubation period.

OBSERVATIONS

Penicillin was administered prophylactically to 13,113 persons; potassium penicillin G was given orally to 7,307 in a dosage of 313.5 mg (500,000 units) a day for 10 days, while 5,806 received either 495.5 mg (600,000 units) or 743.2 mg (900,000 units) of benzathine penicillin G intramuscularly. During the six-week period of this study, 68 of the 13,113 (0.5 per cent) were admitted as patients who filled the above criteria. Of the reactions in these patients, 52 followed intramuscular administration of penicillin and 16 followed oral administration. Fifty of the patients stated that they had received penicillin before this study. Eleven stated they had not taken penicillin previously in any form, and seven

From 7100th U. S. Air Force Hospital, APO 633, New York, N. Y.

were not certain. In the whole series, 10 patients gave a family or personal history of atopy.

HOSPITAL STAY

Complete blood counts, urinalyses, and sedimentation rates were obtained for 59 of the 68 patients. In this group of 59, the average hospital stay was 5.9 days. The range was from 2 to 10 days, except for two patients who stayed for 22 and 28 days, respectively. There was little apparent difference in the number of days of hospitalization between those who had taken penicillin orally and those who had received intramuscular injections. All patients were discharged from the hospital when they had been free of symptoms for 24 hours. Four were later readmitted in relapse after strenuous physical activity. Many other patients undoubtedly had minor relapses, but not severe enough to necessitate rehospitalization.

CLINICAL PICTURE

Of the 68 patients studied, 14 had mild or severe angioneurotic edema, 20 had transient urticarias of the typical "hive" type, 7 developed the so-called fixed urticarias, and 25 presented a picture of typical erythema multiforme-like reactions (fig. 1). One of these patients developed large bullae at the site of the urticarial lesions (erythema multiforme bullosum). Five patients developed purpura; in two this appeared to be primary, and in three the purpura was secondary to severe urticarial lesions. One patient, who had no atopic history or background, developed a fine papular eruption in the flexural folds. This subsided completely in three days. Another patient developed a mild anaphylactoid shock-type reaction with angioneurotic edema about the face within 20 minutes after ingestion of the first penicillin tablet. Joint pain and swelling were present in 41 of the 68 patients, and 7 were initially admitted to the hospital with the provisional diagnosis of rheumatic fever with joint pains, tachycardia, and urticarial skin eruptions. Four other patients initially developed morbilliform eruptions and temperatures and were admitted to isolation wards with the provisional diagnosis of rubella. Thirty-four patients had temperature elevations of over 100° F orally.

On admission to the service, the patients were given in rotation either a placebo, an antihistaminic, or 20 units of corticotropin (ACTH) intravenously, and all were placed on bed rest. Those who received the placebo progressed as well as those given an antihistaminic or ACTH. Four patients with extremely severe reactions and discomfort were given cortisone orally. The patients on cortisone treatment were discharged within 24 hours after the subsidence of their reactions, as were the others; however, they

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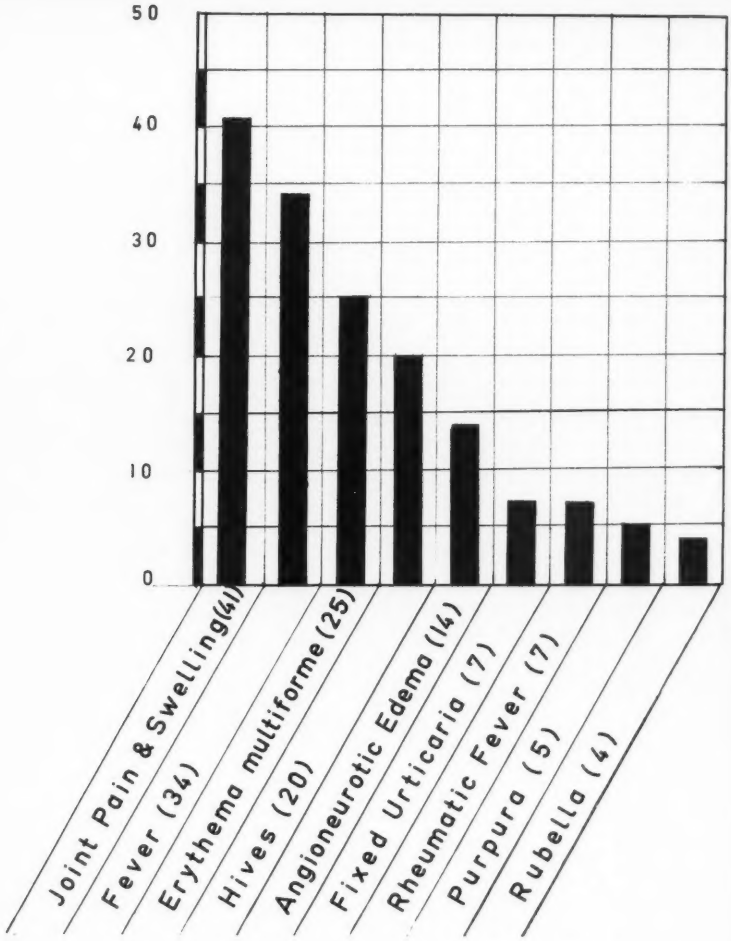

Figure 1. Clinically observed reactions of 68 hospitalized patients to prophylactically administered penicillin.

were followed closely on an outpatient basis and the cortisone gradually withdrawn.

LABORATORY RESULTS

Urinalyses were reported for 61 of the 68 patients. Four specimens showed abnormalities: one with 1-plus albumin and three with 30, 80, and 200 red blood cells per high-power field. Repeated urinalyses in these cases proved to be negative.

Sedimentation rates, determined on 59 patients, were divided into three groups—those from 1 to 10 mm/hour, those from 11 to 20 mm/hour, and those above 20 mm/hour. Sedimentation rates of the patients in each group were compared with the average days of hospitalization, leukocyte count, and febrile reaction (table 1). Of the 59 patients, 37 had sedimentation rates of over 10 mm/hour, with 21 patients having sedimentation rates of over 20 mm/hour. Nine of these were above 30, the highest being 48 mm/hour. Grouping these patients by sedimentation rates and comparing these rates with the average days of hospitalization revealed that there was little relationship between sedimentation rate and length of hospitalization. No significant conclusions could be drawn concerning the relationship between oral administration of penicillin and elevation of the sedimentation rate.

TABLE 1. *Relationship of sedimentation rate to leukocytosis, elevated temperature, and length of hospitalization of 59 patients.*

Sedimentation rate (mm/hr)	Number of patients			Days in hospital		Leukocytosis		Fever	
				Average	Range	Number	Per cent	Number	Per cent
1-10	22	Injection	16	6.6	2-10	10	46	10	46
		Oral	6	5.8	3-9				
11-20	16	Injection	11	5.4	2-9	6	38	12	75
		Oral	5	4.0	3-5*				
21 plus	21	Injection	20	6.3	3-9**	13	62	12	57
		Oral	1	4.0	-				
Total	59	Injection	47	5.9	-	29	49	34	58
		Oral	12						

*One was 22 days.
**One was 28 days.

Leukocyte and differential blood counts were reported for 59 of the patients. A leukocytosis exceeding 10,000/μl was found in 29 cases, the highest being 18,000/μl. Table 1 indicates that there was little association between leukocytosis and sedimentation rates. Differential counts were not abnormal, only one patient showing a significant elevation of the eosinophil count.

CLINICAL FINDINGS

Thirty-four patients showed febrile reactions of over 100°F. It is interesting to note from table 1 that there was no apparent relationship between the number of patients with fever and the extent of elevation of the sedimentation rate.

As shown in figure 1, 41 patients had joint pain and/or swelling of the joints at some time during their hospitalization. We were unable to demonstrate any apparent relationship between the presence of joint involvement and either the number of days' hospitalization or the degree of elevation of sedimentation rate.

Reaction Time. For the 52 patients who had received benzathine penicillin G intramuscularly, the time from the injection to the beginning of allergic symptoms averaged 10.3 days with a range of 1 to 21 days. There was no apparent relationship between the degree of elevation of sedimentation rate and the time of onset of symptoms. Although it has been thought that a prolonged incubation period may be followed by a more severe and longer-lasting allergic reaction, we were not able to demonstrate that those with long incubation periods spent more days in the hospital than those with short ones. The patients were divided into three groups by the number of days from injection to development of symptoms. As may be seen in table 2, 38 (73 per cent) of the 52 were in the 4- to 14-day group. There were 7 in the 1- to 3-day group and 7

TABLE 2. *Incubation periods of penicillin reactions and length of hospitalization in 52 patients receiving penicillin intramuscularly.*

	Group 1	Group 2	Group 3
Number of patients	7	38	7
Number of days between injection of penicillin and reaction	1-3	4-14	15-21
Days hospitalized	6.0	5.3	5.0

in the 15- to 21-day group. Contrary to our previous clinical impressions, the reactions of the latter group were neither more severe nor longer lasting than those in the other groups.

SUMMARY AND CONCLUSIONS

This study attempted to associate the severity of prophylactic penicillin reactions with common laboratory studies, certain clinical observations, and incubation periods. No association was evident in terms of average days of hospitalization between elevated sedimentation rate, leukocytosis, or fever. In those

patients with elevated sedimentation rates there was no association with the presence or absence of joint involvement, fever, or elevated white blood cell count. The time interval between injection of the drug and appearance of symptoms (incubation period) had little bearing on the length of hospitalization. In these hospitalized patients, reactions from benzathine penicillin G were apparently no more severe or prolonged than those from penicillin given orally.

It must be re-emphasized that the presenting symptoms and laboratory findings in many of these patients may closely simulate those of acute rheumatic fever and/or several of the exanthemata.

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MED. ABBR.

"Another reprehensible form of jargon is the medical abbreviations which cause the inexperienced speaker to say 'LMD sent pt in with clouded CVA and abnormal EKG. IVP was normal but LUQ was tender and AURI was present. PPD was OK and lab showed CBC compatible with DOA.' The speaker might just as well lapse into Hindustani which would be much more musical and just as informative. Another pernicious habit is to compare everything with food, as 'rice water stool,' 'prune juice sputum,' 'pea soup pus,' 'walnut-sized mass,' 'anchovy sauce pus,' 'cauliflower mass,' 'currant jelly stool,' etc. ad nauseam."

—WARNER F. BOWERS, Col., MC, USA
in *Military Medicine*
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THE ISOLATION OF ENTERIC PATHOGENS AT BARROW, ALASKA

JACK W. CULLISON, *Technical Sergeant, USAF*
THOMAS R. A. DAVIS, *M. D.*

REPORTS of gastroenteric diseases in Alaska, though common and substantiated by observation, have not received adequate epidemiologic study. In 1953 Pauls[1] stated that outbreaks of diarrheal diseases commence during the spring "breakup" and continue throughout the summer. The peak of incidence during this period is not known, and an evaluation of the true incidence and severity of such disturbances is difficult because cases are poorly documented, containing little information as to the specific causes of the disease. In 1950 Williams[2] published a list of Salmonella and Shigella organisms isolated in Alaska indicating the presence of a number of types of both groups. Early reports[2,3] cited outbreaks of typhoid and paratyphoid occurring at Barrow, Alaska, and blamed water as the means of transmission. Because of the sporadic distribution of cases, a recent study[4] throws some doubt on the involvement of water as a means of transmission.

During the months of November 1954 and February and July 1955, this laboratory had opportunities to conduct studies of enteric pathogens among the Eskimos at Barrow, Alaska. This study was initiated to determine the possible influence of the enteric disease problem in Alaska on military personnel stationed in remote areas.

Barrow, an Eskimo village situated on the northernmost tip of the Alaskan Territory in 71° 21′ north latitude and 156° 17′ west longitude, is composed of some 1,200 Eskimos. This particular village was selected because it was believed to be typical of most coastal villages, and many of the facilities required for this study were available at the Alaska Native Service Hospital.

From Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Sgt. Cullison is now assigned to U. S. Air Force Hospital, Parks Air Force Base, Calif., and Dr. Davis is at the U. S. Army Medical Research Laboratory, Fort Knox, Ky.

METHODS AND RESULTS

Fecal specimens were collected in 4-ounce ointment containers which had been distributed to the natives through the Alaska Native Service Hospital personnel. Response was good, and a total of 240 samples were collected.

The preliminary bacteriologic examination consisted of introducing 1 gram of feces into tetrathionate or selenite-F enrichment broth and incubating for from 18 to 24 hours at 37°C. Specimens were then transferred to Salmonella-Shigella (SS) agar plates and again incubated for a period of 24 hours at 37°C. Suspicious colonies were then transferred to nutrient agar slants, incubated, and returned to this laboratory for further investigation.

Generic identification was based upon their cultural and biochemical reactions in Kligler's iron agar, SS agar, together with the absence of urea production and their reaction in various carbohydrate fermentation media. Organisms displaying characteristics for Salmonella or Shigella were then typed with Salmonella polyvalent serum, grouping seras, and Shigella grouping sera.

Thirty-six isolations of *Salmonella typhimurium* and one of *Shigella sonnei* were made from the fecal examinations. None of the natives had diarrhea during the samplings, thus the organisms represent a subclinical or carrier state.

Ten of the samples obtained in February 1955 were from individuals who had been previously sampled during the preceding November. Four of these subjects were found to possess *S. typhimurium* in November, but not in February. Two individuals were found to have this organism in both November and February. The subject positive for *S. sonnei* in November was negative in February.

Numerous cultures of paracolon organisms, most of which belonged to the Hafnia group, were isolated. At the present time the pathogenicity of the paracolon group is debatable, and an evaluation of the part they play in the gastro-intestinal diseases must await further studies. However, the present evidence indicates that they may produce disease under certain conditions.

Results of the cultures are given in table 1. Ages of the individuals from whom samples were taken varied from 22 days to 75 years. This number represents the combined number of individuals from each of the three sampling periods. Age distribution agrees with other records of incidence of these organisms in that well over half the number of positive cultures occurred in the first two age groups.

TABLE 1. *Incidence of Salmonella in fecal specimens from the native population of Barrow, Alaska*

Age groups (years)	0-9		10-19		20-29		30-39		40-49		50		Totals	
Season*	W	S	W	S	W	S	W	S	W	S	W	S	W	S
Number sampled	52	33	23	9	31	5	23	10	20	12	11	11	160	80
Number positive	7	5	5	2	1	3	1	2	1	2	4	3	19	17
Per cent positive	13.5	15.2	21.7	22.2	3.2	60.0	4.3	20.0	5.0	16.7	36.4	27.3	11.9	21.3
Significance of difference between winter and summer	None		None		P<.01		None		None		None		None	

Combined significance for 20-49 year age groups: P<.01

*W: winter; S: summer

As seen from table 1, a significant difference between winter and summer samples existed in the 20- to 29-year age group. These statistical differences were computed by the chi-square method with corrections applied for small sampling numbers where appropriate.

DISCUSSION

The table shows that in all age groups carrier rates were high, and no demonstrable clinical symptoms in any of the people investigated could be elicited. Because of the seasonal variation of this rate together with the fact that many of the individuals who were positive in the summer were negative in the winter, it is questionable that the use of the term "carrier" is applicable to the Salmonella picture demonstrated in Barrow. It is perhaps more accurate to consider the presence of Salmonella in the stool specimens either as the residuum of a recent clinically demonstrable infection or as evidence of subclinical infection. This would suggest that, at Barrow, reinfection of the community goes on throughout the seasons and that the rate is altered by the influence of seasonal change on the total availability of the infecting organisms. The practice in coastal villages is to obtain a water supply in the summer from sources which are easily contaminated by unhygienic practices of garbage and human waste disposal. In the winter, the water supply at Barrow is stated to be obtained by cutting ice blocks from a nearby lagoon. This may be true in many instances, but personal observations have shown that much of the water supply is obtained by melting snow collected from the immediate vicinity of the home, where dog teams are tethered and where human waste is thrown from "honey buckets." Thus continuous reinfection of the population can occur. This in turn produces a high immunity rate in the community, which could produce the sporadic appearance of clinical cases difficult to correlate as to method of transmission. Salmonella studies by this laboratory in the canine population of Barrow have shown rates of infection similar to those demonstrated for humans in this report.[5]

The study reported here does not show the presence of *Salmonella typhosa* or any other members of this genus. Since other studies have reported outbreaks labeled typhoid and associated with some reports of isolation of the organism,[2-4] the lack of such evidence in our study may be due to the sampling inadequacy. Only one isolation of Shigella was found, and a second sample from this individual three months later was negative. Again this may be due to the limitations of the methods used in this study.

This report adequately demonstrates the importance of enteric diseases in an arctic village. Their impact on the morbidity and mortality of the population is not known because of the difficulties of being on the spot at the right time and the inadequacy of existing records. In another similar study at Fort Yukon,[6] there was found to be a high incidence of diarrheal disturbances in the 0- to 9-age group, occurring eight times oftener than in any other age group.

With the exception of *S. sonnei,* it is unlikely that the enteric pathogens as found here will seriously affect the well-being of military personnel. The military practice of immunization and the existence of cross-immunization together with reasonable sanitation measures will afford protection. However, mild gastro-enteric disturbances in military personnel in the arctic do occur, and the influence of these on over-all operational efficiency is a factor to be considered.

SUMMARY

Investigation of the population of Barrow for salmonellosis shows a relatively high incidence of the causative organism in all age groups. A seasonal variation is demonstrated with about a 100 per cent increase of isolations in the summer as compared with those in the winter. The implications of these findings are discussed.

ACKNOWLEDGMENTS: The technical assistance by Sergeant E. D. Pace and Airman First Class S. D. Slevin and the co-operation of the personnel of the Alaska Native Service Hospital at Barrow are gratefully acknowledged.

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IMPROVING PREDICTABILITY OF MINNESOTA MULTIPHASIC PERSONALITY INVENTORY

GERALD J. BRISKIN, *First Lieutenant, MSC, USAR*
JAMES W. STENNIS, *A. B.*

OVER a period of two years in our particular setting, a mental hygiene clinic on a military reservation, we have become increasingly aware of a discrepancy between diagnostic statements made from the Minnesota Multiphasic Personality Inventory (MMPI) and the final diagnosis arrived at by joint staff efforts. The MMPI profiles consistently indicated that the patients were far sicker than they appeared either clinically or by other psychologic instruments.

This discrepancy appears to be the result of differences between the population of this particular Army post and the population on which the MMPI was standarized. We are dealing with an essentially younger population (mean age 22 years, standard deviation 3.84 years) in a setting in which illness can bring strong secondary gain such as light duty, hospitalization, dismissal of possible courts-martial charges, and even release from service.

Our intent in this study was to revalidate the MMPI for the specific population with which it was being used.

METHOD

An attempt was made to increase the predictive ability of the MMPI by revalidating it to conform more readily with the specific population with which it was being used. This was accomplished by (1) determining the means and standard deviation for each of the subscales of 80 MMPI profiles selected at random from our files and (2) recalculating the T scores for the population being studied. To fix the average score at 50 this standardization (table 1) was accomplished by use of the following formula:[1]

$$T = 50 + \left(\frac{X - \overline{X}}{S} \right) 10$$

From Mental Hygiene Consultation Service, Fort Campbell, Ky. Dr. Briskin is now at Byron Harless and Associates, 420 West Lafayette Street, Tampa, Fla.

Twenty-four MMPI profiles were next selected at random from the files. None of these records had been included in the above samples. Using the usual precautions to control for bias, two experienced clinicians then interpreted them, attempting to place them in one of the following diagnostic categories: normal, neurotic, psychotic, and character and behavior disorder.[2]

TABLE 1. *Revalidated means and standard deviations of the subscales of the MMPI for the Fort Campbell population*

Subscale	Mean	Standard deviation
?	47.95	24.59
L	4.44	2.68
F	11.78	9.67
K	12.08	5.13
Hs	12.93	7.23
D	27.37	8.00
Hy	27.31	7.10
Pd	26.25	6.35
Mf	23.23	5.65
Pa	13.36	7.80
Pt	23.80	11.70
Sc	27.13	15.25
Ma	19.78	5.90

These 24 records were then replotted, using the T scores determined above, and again interpreted in terms of the four scoring categories. Chi squares were then calculated to determine whether or not the clinicians were in significant agreement with each other.

Each of the clinician's judgments, from both the standard MMPI data and the revalidated data, were compared to the final diagnosis (table 2) and tested by chi square. The final diagnosis of the patient was arrived at by psychiatric interviews, a complete battery of psychologic tests, and a social history.

RESULTS

Table 3 summarizes our findings. Dealing with standard MMPI's, the judges agreed diagnostically on 15 cases and disagreed on 9. The chi square of their agreement is 18.00 and is significant at the 0.001 level.

TABLE 2. *Summary of data**

Case	Standard MMPI		Revalidated MMPI		Final diagnosis
	Judge 1	Judge 2	Judge 1	Judge 2	
1	Ne	Ne	Ne	Ne	P
2	C	Ne	C	C	C
3	P	P	C	C	C
4	P	P	C	C	C
5	No	No	Ne	C	C
6	P	P	P	C	C
7	P	P	P	P	C
8	C	C	C	C	C
9	P	Ne	C	C	Ne
10	Ne	Ne	Ne	Ne	C
11	P	C	C	C	C
12	Ne	Ne	Ne	Ne	C
13	P	C	P	P	C
14	P	P	Ne	Ne	Ne
15	Ne	Ne	Ne	Ne	C
16	P	No	No	No	C
17	Ne	C	C	C	C
18	C	No	C	C	C
19	C	No	No	No	C
20	Ne	Ne	C	P	No
21	P	C	C	C	C
22	P	P	C	C	C
23	P	P	C	C	P
24	P	P	C	C	C

*No = Normal
Ne = Neurotic
P = Psychotic
C = Character and behavior disorder

However, in predicting the final diagnosis from standard MMPI's, judge 1 was correct in only 5 cases and judge 2 was correct in 7 cases. These results, when tested by chi square, are purely chance.

When the revalidated MMPI profiles were used, the judges agreed diagnostically on 21 cases and disagreed on 3. This is significant at the 0.001 level. In predicting the final diagnosis, the two judges were able to do so successfully in 11 and 13 cases respectively, and these findings reach significance at the 0.02 level or better.

TABLE 3. *Chi squares showing significance of agreement between judges and final diagnosis*

	Agreement between judges		Agreement between judge 1 and final diagnosis		Agreement between judge 2 and final diagnosis	
	Obtained	Chance expectancy	Obtained	Chance expectancy	Obtained	Chance expectancy
Standard MMPI's						
Agree	15	6	5	6	7	6
Disagree	9	18	19	18	17	18
	$\chi^2 = 18.00^{**}$		$\chi^2 = 0.22$		$\chi^2 = 0.22$	
Revalidated MMPI's						
Agree	21	6	11	6	13	6
Disagree	3	18	13	18	11	18
	$\chi^2 = 50.00^{**}$		$\chi^2 = 5.56^{*}$		$\chi^2 = 10.89^{**}$	

$d^f = 1$

*Significant at 0.02 level

**Significant at 0.001 level

DISCUSSION

Psychologists as scientists prefer to utilize, as well as place greater confidence in, standardized tests. Nevertheless, such tests have serious limitations. Because they are so well standardized the tendency is to use them blindly in all clinical settings without regard to the particular population involved. Yet these populations, or subpopulations if you will, may vary markedly in cultural background, needs, attitudes, or other variables, and these discrepant variables may seriously impair the validity of the test being used.

Certain tests lend themselves to revalidation readily. When such is the case, as in this study, revalidation can improve the predictive ability of a test to a significant degree.

It should be pointed out that even though the judges in this study were able to predict the criterion significantly, their combined predictive accuracy was only 50 per cent. Even allowing for errors in the final clinical diagnoses, this predictive accuracy is lower than would be optimally desired. It is suggested that the percentage of correct predictions can be further increased if tests are given in batteries. When the diagnoses, based on a test battery, for the experimental group are compared to the final clinical diagnoses, the predictive accuracy rises to approximately 79 per cent (agree 19, disagree 5).

Consequently, we conclude that increased predictive ability can be obtained by specific revalidations of the test involved and/or the administration of test batteries.

SUMMARY

An attempt was made to increase the predictive ability of the Minnesota Multiphasic Personality Inventory (MMPI) by revalidating it to conform more readily with the specific population with which it was being used. This was accomplished by determining the means and standard deviations for each of the subscales and then recalculating the T scores for the population being studied.

Making diagnostic predictions on the basis of four categories—normal, neurotic, character and behavior disorder, and psychotic—two judges, using the revalidated data, were able to predict with significant accuracy the final psychiatric diagnosis. When these same judges attempted to predict the final diagnosis, using the standard MMPI profiles, their efforts were on a purely chance basis.

In conclusion, it is believed that the predictive ability of the MMPI can be improved if the test is specifically revalidated for the particular subpopulations with which it is being used.

The method outlined above is suggested for determining local norms which may be used by psychologists employing the MMPI and/or tests of a similar nature.

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Clinicopathologic Conference

U. S. Naval Hospital, Philadelphia, Pa.*

ATAXIA, DECREASED VISION, UPPER EXTREMITY WEAKNESS

Summary of Clinical History. Since birth this 25-year-old white woman had decreased vision of the left eye with occasional diplopia. She has also had intermittent anorexia for several years with frequent bouts of nausea, vomiting, and hiccoughing. At the age of 23, when 6 months pregnant, she was admitted to another hospital with frequent hiccoughing, weakness of the right arm, and inability to raise the right hand. A myelogram showed evidence of a central nervous system lesion involving almost the entire cervical canal. A cesarean section was performed with delivery of a living male fetus.

Following discharge from that hospital, the patient's condition remained essentially the same, although there was an increase in weakness of the right hand and arm. Right occipital and temporal headaches occurred at more frequent intervals, and she lost 40 pounds. She did not consult a physician in the two years since her discharge from the other hospital. She was admitted here at the age of 25 years and weighing 91 pounds.

Physical Examination. On admission the patient was a fairly well-developed but emaciated woman appearing her stated age of 25 years. The pupils were round, regular, and equal and reacted to light and accommodation. Extra-ocular movements were

*Capt. Charles L. Ferguson, MC, USN, Commanding Officer. From the Neurosurgical Service, Lt. Neal I. Aronson, MC, USNR, Chief.

normal. Visual acuity was markedly diminished in the left eye. Funduscopy was unsatisfactory, but dilated tortuous veins were seen in the left eye, and in the medial part of the retina several small red spots were noted. There was tenderness on percussion and palpation of the posterior aspect of the neck from the atlas to the 7th cervical vertebra. No lymphadenopathy was noted. Lungs were clear to percussion and auscultation. The heart was normal in size, position, rate, rhythm, and force. No murmurs were heard. The abdomen presented a well-healed midline cesarean section scar. There was an orange-sized mass in the epigastrium and periumbilical region, which was apparently freely movable but firm and nontender. A neurologic examination showed marked weakness of the right hand, forearm, and arm, moderate weakness of the left hand and arm, and atrophy of the muscles of both hands. The gait was slightly ataxic, and there was a negative Romberg sign. Concentric contracture of the visual fields of the left eye, greater in the temporal fields, was noted. Vibratory and position senses in the right upper extremity were absent. The lower extremities showed hyperactive deep tendon reflexes throughout. Hoffmann's sign was positive on the right.

Laboratory Studies. A lumbar puncture revealed that cerebrospinal fluid pressure was 140 mm, which was elevated to 310 mm by abdominal straining and to 230 mm by bilateral jugular compression. Six milliliters of clear, slightly xanthochromic fluid was removed. Cerebrospinal fluid protein was 10 to 20 mg/100 ml. Blood studies revealed the hemoglobin to be 13 g/100 ml; the white blood cell count and differential were normal. The Kahn test was negative, and the blood sugar and blood urea nitrogen were within normal limits. Urinalysis showed no abnormalities.

Course in Hospital. One month after admission to this hospital a laparotomy was done, at which time a firm mass 5 cm in diameter was excised from the tail of the pancreas. This specimen consisted of a fibrous-walled cyst with calcification, external to which was a moderate amount of pancreatic acinar tissue showing minimal inflammatory and fibrotic changes. A diagnosis of fibrous cyst was made.

The patient was seen by a neurosurgical consultant, and at his suggestion a ventriculogram was recommended prior to attempting surgical laminectomy in an effort to alleviate the symptoms of central nervous system disease. A ventriculogram was carried out successfully; however, the patient became extremely restless following the procedure. Amytal Sodium (brand of amobarbital sodium) was given. Respirations slowed to three to four per minute, and the patient became comatose and died about four and one-half hours later.

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DISCUSSION

Doctor Aronson: One is always tempted, in dealing with a clinical problem, to seek a common denominator which will explain diverse and seemingly unrelated findings. In the case at hand, that approach is too attractive to ignore. In this protocol, we are presented with a young woman who is afflicted with disease in several organs. She has disturbed vision in her left eye, which is apparently due to some congenital or perhaps familial disease in the globe as it has produced lifelong disturbance in vision associated with a vascular anomaly of the fundus.

In addition, we are told that she has a lesion of the cervical spinal cord. There is ample evidence of this clinically, and the marked sensory disturbance, atrophy and weakness in the upper extremities, and spasticity in the lower would strongly suggest that it is intramedullary, tending to be somewhat right-sided in location. Further, there apparently is irritation either of the phrenic centers in the cervical cord or perhaps of the visceral centers of the medulla. It could be that the process extends upward to the medulla. The additional findings of headaches and ataxia suggest the possibility of a second lesion in the posterior fossa as a possible cause of the vomiting, hiccoughing, headaches, and equilibratory disturbance which she exhibits. One could predicate a cerebellar lesion compressing the 4th ventricle and medulla and thus producing obstructive hydrocephalus and irritation of medullary centers. The lack of involvement of the lowermost cranial nerves would suggest this possibility rather than that of an intramedullary process from the cord to the medulla because the latter would produce, in all probability, lower motor neuron involvement in the distribution of those nerves whose nuclei lie in the medulla. There is little or no evidence in the protocol which would point to a supratentorial brain lesion as a cause of these findings.

Finally, we are told that a pancreatic cyst was found and removed at laparotomy. Although I may be going far afield, it seems necessary to tie all the findings together into a single syndrome, one of the so-called phacomatoses. Specifically, I refer to the nosologic entity known eponymically as Lindau-von Hippel disease. Angiomatosis retinae was described by von Hippel[1] in 1904. One or both eyes may be affected. One sees large tortuous veins which often contain bright red blood and are accompanied by a large artery which shows beading and variations in caliber. The vessels lead to rounded nodules, usually situated in the periphery of the retina and believed to be hemangioblastomas.

Lindau[2] in 1926 established a relationship between cerebellar and retinal tumors. He showed that a tumor histologically similar to that found in the retina could be found in the cerebellum. These tumors were hemangioblastomas (occasionally known as hemangioendotheliomas) and were frequently cystic. He pointed out that many lesions previously diagnosed as benign cysts or gliomatous cysts of the cerebellum were actually hemangioblastomas with a small mural nodule of tumor surrounded by a large cyst whose wall consisted of glia, and that the tumor

nodule was often missed. In addition to the retinal lesions which occurred in relatively few cases, there were, not infrequently, hemangioblastomas of the brain stem and spinal cord; epithelial cysts, angiomas, and cystadenomas of the pancreas; cysts and angiomas of the liver, spleen, and kidneys; tumors resembling hypernephromas of the kidney; paragangliomas and adenomas of the adrenals; cystadenomas of the ovaries; cysts of the epididymis; and, in rare instances, cutaneous nevi.

Significantly, only a very few hemangioblastomas have been found above the tentorium. In this connection, the embryologic work of Streeter[3] should be mentioned. He pointed out that the primitive vascular plexus differentiates slowly into arteries, veins, and capillaries early in development, and that during this phase, true vascular tumors might arise. Karlefors (quoted by Cushing and Bailey[4]) stated that during this same period, a very rich vascular plexus consisting of undifferentiated capillaries exists in the posterior fossa and simultaneously a similar condition exists in the eye, thus possibly explaining the frequency of, and association between, lesions of the cerebellum and retina.

The disease is apparently inherited and seems to behave as a simple dominant characteristic. The onset is usually in childhood or early adult life. Wyburn-Mason[5] enlarged on the spinal cord involvement in the disease, mentioning that sites of predilection were the cervical and lumbar enlargements. Often, he states, there is an associated syringomyelic cavity, which gives rise to the usual signs.

Of course, the term syringomyelia is used somewhat loosely by many writers. It is not at all unusual for intramedullary tumors to be associated with large cystic cavities. These cavities usually contain fluid often indistinguishable from spinal fluid. At any rate, clinically and myelographically, there appears to be a hemangioblastomatous cyst of the cervical cord in this case.

The spinal fluid protein is usually quite high in these cases of hemangioblastoma. The protocol tells us that the fluid is xanthochromic and the protein 10 to 20 mg/100 ml. I question the validity of these determinations and would be tempted to add a cipher to each. Incidentally, Levin[6] states that in every case of Lindau's disease in which the cord was properly examined, a spinal tumor was found.

The lesions of the abdominal viscera rarely produce symptoms. The tumors of the kidney that resemble hypernephromas are apparently not malignant. Polycythemia has been reported in several cases but apparently was lacking in this patient. Cramer[7] collected several of these cases and adduced histologic evidence for possible hematopoietic activity in some of these tumors. The cerebellar growths may often be removed unsuccessfully, and the spinal and retinal lesions can occasionally be benefited by operation.

Finally, our patient appears to have died a medullary death rather suddenly. There is a known propensity for these very vascular tumors to hemorrhage. One can only guess at the final incident, but it seems likely that a sudden hemorrhage may have occurred within a hemangioblastomatous cyst of the cerebellum as a result of the upsetting of pressure relations incident to ventriculography.

Dr. Aronson's diagnosis:

Lindau-von Hippel disease with (1) angiomatosis retinae, left eye; (2) hemangioblastoma of cervical spinal cord, probably cystic; (3) probable cystic hemangioblastoma of the cerebellum with obstructive hydrocephalus and possible terminal hemorrhage causing medullary failure; and (4) cystic anomaly of the pancreas and possibly of other organs.

PATHOLOGIC FINDINGS

Doctor Watts:* At autopsy cyanosis was visible and was most marked in the dependent portions of the body and at the extremities, the fingers and toes. A well-healed lower abdominal scar was present, and the hair had been shaved from the scalp. No anomalies were visible. Two bur holes were present in the occipital bones, one on each side.

The most important findings were those of the central nervous system. Lying over the right occipital region beneath the dura, there was approximately 50 ml of recently clotted blood covering an area measuring 6 cm in diameter and 1.5 cm in thickness. The brain substance was depressed in the area of this hematoma. The other external vessels of the brain appeared normal. A yellowish-brown tumor of firm consistency was present in the cervical cord (fig. 1). This began just caudal to the 4th ventricle, protruding slightly up into it, and continued down through the pons and medulla into the first portion of the cervical cord. The entire tumor measured 4 cm in length and 2 cm in greatest diameter. In the region of the 4th ventricle, it was solid and yellowish and contained blood. In the pons (fig. 2) it was cystic, bearing multiloculated spaces with thin walls and smooth linings filled with coagulated, semiopaque, grayish-white material. In the medulla, solid yellow tissue was present. The cervical cord involved by the tumor showed necrosis, and much of the tumor had sloughed away, leaving a ragged, cystic space. A small nodule of tumor was present on the anterior surface of the cervical cord. This nodule was solid and golden yellow.

No involvement of the cerebellum by tumor was seen, nor were there any changes in the cerebrum itself. A few minute hemorrhages were present in the cerebrum scattered in several areas. These were interpreted as secondary to encephalography. Microscopic examination showed that the tumor itself consisted of a mixture of small vascular

*Lt. Harvey F. Watts, MC, USNR, Pathological Service.

Figure 1. Cervical spinal cord showing the partially necrotic, hemorrhagic lesion which is continuous with the one in the medulla and pons. The small, discrete lesion on the anterior surface of the cord is shown farther toward the caudal end.

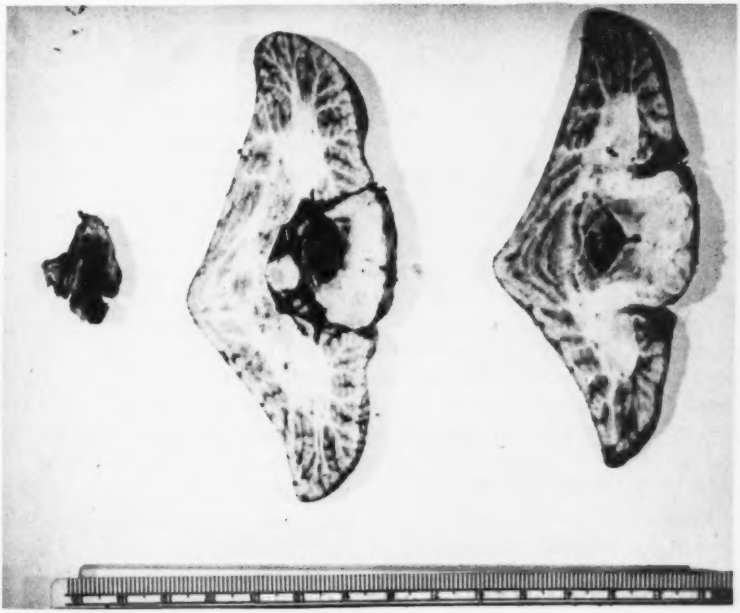

Figure 2. Coronal sections of the cerebellum and pons showing the location of the centrally placed hemangioma. Recent hemorrhage is present.

spaces and somewhat more solid areas of closely packed endothelial-type cells. Pigment-laden macrophages were present in the tumor tissue, and in addition, recent hemorrhage, older hemorrhage, and necrosis were also evident. Other portions, those representing the grayish translucent cysts seen grossly, consisted of larger spaces lined by endothelial cells and containing a coagulum of protein-like material. The cellular makeup of the tumor was such that its origin appeared to be hamartomatous rather than actually neoplastic; that is, no evidences of malignant or invasive growth could be seen, and the individual cells were of uniform structure. No other significant microscopic changes were seen in the central nervous system. The anterior lobe of the pituitary gland, however, did show several small areas of acute ischemic focal necrosis. The cause of this necrosis was not apparent from the examinations performed.

Other findings of interest were present in the abdominal viscera. The pancreas showed fibrosis of its body and tail, and there were several small cystic spaces, the largest measuring approximately 1 cm in diameter, within its substance. Microscopic examination showed that these were lined by cuboidal and occasionally mucus-type epithelium and surrounded by fibrous connective tissue. The islets and acinar structures of the pancreas appeared undisturbed. There was slight inflammatory infiltration in the areas of fibrosis. Slightly yellowish, turbid fluid was present in one of these cysts. Other cystic structures contained dark, bloodstained fluid. No obstructive change in the pancreatic duct system was found.

Both kidneys contained several small, smooth-walled cysts filled with clear fluid. The largest of these measured approximately 7 mm in diameter. A disk-shaped scar which extended deep into the substance of the organ was present in the right kidney and measured 7 mm in greatest dimension. Microscopic examination of this area showed that immediately adjacent to the scar, a small, localized collection of cells with clear cytoplasm containing fine vacuoles and small, evenly stained nuclei was present. These cells resembled those of the adrenal cortex. This was the only focus of such tissue found in the kidneys. The renal cysts were lined by a flattened to cuboidal epithelium. No angiomatous lesions were found in the abdominal viscera. A few small areas of focal cortical hyperplasia of the left adrenal gland were present. The urinary bladder was congested and its mucosa edematous. However, it contained clear urine. No other significant abnormalities were discovered at the autopsy examination.

Review of the pancreatic tissue previously removed at operation revealed a structure similar to that of the lesions present in the pancreas at autopsy. The anatomic diagnoses, then, were (1) hemangioma of the cervical spinal cord, the medulla, and the pons; (2) Lindau-von Hippel syndrome consisting of a central nervous system angioma with pancreatic cysts, renal cysts, adenoma of the right kidney, and angioma of the left eye; (3) epidural hemorrhage over the right occipital

area, secondary to encephalography. Unfortunately, the eyes were not examined at autopsy. It was felt that the cause of death was respiratory failure secondary to mechanical pressure changes, associated with hemorrhages in the cervical cord and medullary tumor and epidural hemorrhage in the region of the craniotomy.

This interesting case presents the findings of a disseminated defect involving the blood vessels and epithelial structures. It is believed by many that the vascular lesions of this defect are not true neoplasms nor are the epithelial dysplasias truly neoplastic. The term hamartoma has been used to categorize the vascular and epithelial changes and in this use implies that these are malformations in which the various tissues of the part are present in improper distribution or proportion, often with prominent excess of one particular tissue. Thus, since blood vessels are present in great numbers within the central nervous system and in the eye, the occurrence of vascular channels in these areas does not imply a neoplastic change. Also, such lesions designated as hamartomas do not possess disproportionate powers of growth, and though growth may be apparent for a period of many years, it reaches an ultimate conclusion. Apparent continued growth may represent simply the reaction of trauma or, in the case of vascular lesions, thrombosis or hemorrhage, with resultant degenerative and edematous changes. It seems, from the examination of the central nervous system lesion in this patient, that the symptoms of exacerbation may well have resulted from such a vascular accident. Evidence of old and recent hemorrhage and necrosis were present. The epithelial lesions in this patient seemed even more likely to be malformations than neoplastic changes.

Doctor Erdbrink:* Doctor Aronson is to be complimented for his skillful evaluation of this very interesting case.

Ophthalmologists like to refer to angiomatosis of the retina as von Hippel's disease, and to angiomatosis of the central nervous system as Lindau's disease. Thus, the particular association of retinal and cerebellar hemangiomas is referred to as Lindau-von Hippel disease, this being a congenital mesodermal malformation having neoplastic traits occurring in neuroectodermal tissue, the retina, and the central nervous system.

Von Hippel's disease is relatively rare. It may be bilateral; if unilateral, the left eye may be slightly more frequently affected. It appears most commonly in the third decade of life, and there is a definite familial incidence.

Clinically, angiomatosis may be extremely pleomorphic, but there are stages of early vascular dilation and angiomatous formation, then hemorrhages, exudation, cyst formation, retinal detachment, and the

*Lt. Comdr. Wayne L. Erdbrink, MC, USN, Ophthalmological Service.

final stage of glaucoma and ultimate functional destruction of the eye. Ophthalmoscopically, the typical stage of the disease exhibits a cystic tumor in the peripheral retina with greatly dilated vessels running out to feed it. The course of the disease is relatively slow, but the progression is relentless.

Therapeutic efforts in angiomatosis retinae consist of electrosurgery and x-ray radiation. The prognosis is poor unless the disease process is treated extremely early in its course.

Doctor Watts: Does any retinal angioma mean von Hippel's disease?

Doctor Erdbrink: No. Congenital tortuosity and dilatation of the retinal vessels, an arteriovenous aneurysm of the retinal vessels, a circumscribed capillary hemangioma of the retina, and Coats's disease (massive, exudative, and hemorrhagic retinitis) must be considered in the differential diagnosis. A cavernous hemangioma of the optic disk should not be confusing, nor should the choroidal angioma of the Sturge-Weber syndrome.

Doctor Aronson: In my experience, it is unusual to see angiomatosis retinae with angioma of the nervous system. That is, most cases of central nervous system angiomas do not show retinal angiomata.

Doctor Romanul:* I should like to differ with Doctor Aronson. I have seen several patients with central nervous system hemangioma in whom no retinal lesion was seen before operation. After operation, however, when the diagnosis had been established, careful funduscopic study showed peripherally located hemangiomatous lesions. I believe that due to the unfortunate habit of most neurologists and neurosurgeons to limit their funduscopic examination to the disk, and sometimes also the macula, many peripherally situated hemangiomas are not seen. It is difficult, therefore, to estimate the incidence of retinal lesions in any particular series.

Doctor Aronson: My experience and the literature show a rare association of the two lesions. Perhaps many of the reported cases were examined only by neurologists and neurosurgeons and without the use of a cycloplegic agent. This would account for missing some of the less conspicuous peripheral lesions. I am sure that a competent ophthalmologist can see many things a neurologist might overlook.

Doctor Turville:** What does surgery offer in these cases?

Doctor Aronson: Decompression procedures may give long relief. These are not malignant lesions. The patient under discussion here would have done better with earlier decompression.

Doctor Cooper:*** Are there any x-rays on this case?

*Lt. Flaviu C. Romanul, MC, USNR, Neurological Service.
**Comdr. William C. Turville, MC, USN, Surgical Service.
***Capt. Robert A. Cooper, MC, USN, Executive Officer.

Doctor Strunk:* No films were available.

Doctor Watts: A careful study[8] of the family history of a patient with this disease, by means of public records and written statements in family Bibles and covering a period of about nine generations, appeared in the *American Medical Association Journal* in recent months. It showed strikingly the familial and hereditary aspects, and also demonstrated the varied clinical manifestations.

We selected this case for presentation because it offered a consideration of an unusual and interesting disease. So far as practical implications are concerned, the participants have mentioned that, while complete therapeutic success is unusual, definite benefit to the patient in the form of symptomatic relief may be obtained. An awareness of the nature of these lesions and of their hereditary occurrence may prove helpful in the detection and management of some of these patients.

Pathologic diagnoses:

1. Hemangioma of the cervical spinal cord, the medulla, and the pons
2. Lindau-von Hippel syndrome consisting of central nervous system angioma with pancreatic cysts, renal cysts, adenoma of the right kidney, and angioma of the left eye
3. Epidural hemorrhage over the right occipital area, secondary to encephalography

*Comdr. William M. Strunk, MC, USN, Radiological Service.

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SERVICE ARTICLE

PSYCHIATRIC PROBLEMS IN U. S. ARMY INSTALLATIONS IN EUROPE

HOWARD P. ROME, *M. D.*

THE military psychiatrist's job in a very important measure is concerned with dispositional activities. However, a psychiatrist's training conditions him to think almost automatically in terms of the best interests of the patient. These are often in contrast to the needs of a military organization whose standards are those of readiness for combat. There inevitably results from this discrepancy of goals conflict as to procedure, despite directives, regulations, and the rest. It is incumbent upon a Psychiatric Consultant to reconcile these disparate aims by frequent discussions and consultation. The problem is of sufficient magnitude to make such a task a full-time job.

The reports of Civilian Psychiatric Consultants which I have been privileged to review have surveyed all of the roles of the psychiatrist-medical officer as well as the kinds of problems with which he is confronted. There is little which I can add to them, but it occurs to me that many of them are expressions of situations which can be understood best if they are couched in the sociologic context in which they occur.

THE PROBLEM OF THE PSYCHOSES

There is a fixed incidence of frank psychoses which occurs in our military population; for example, 2.2 to 2.5 per thousand troops per annum. It is very unlikely that the benefits gained from even excellent mental hygiene programs will change this annual rate of psychoses despite the unquestioned benefit which accrues from them in other spheres. Granted that preliminary screens tend to filter out the overt psychoses, it follows that a rather remarkably fixed annual rate of these problems will require appropriate diagnosis, management, and disposition. The facilities necessary for their adequate handling can be predicted from existing demographic data. Detection and separation through medical channels is the standard operating procedure.

Extracted from a report to the Surgeon General, U. S. Army, of a tour of the U. S. Army Medical Installations in Europe made in September 1954.

Doctor Rome is at the Mayo Clinic, Rochester, Minn. He is a Consultant to the Surgeon General, Department of the Army, in Psychiatry and Neurology.

By and large the psychotic population, as I encountered sample of it, is being managed in an efficient fashion. The physical facilities of the various hospitals provide adequate closed ward accommodations. I was impressed by the measures taken to provide security for these patients. Their design, for the most part, has been improvised from existing physical facilities, employing local material and labor. In the face of this somewhat restricted choice, the responsible medical officers had to house their psychotic patients in physical settings which, if anything, tend to overemphasize the physical security aspects. Window guards, furniture, and doors tend to resemble maximum security installations such as prisons, and hence are somewhat depressing. It should be emphasized that this has not been by planned design, and the psychiatrists and the administrative medical officers are conscious of the inherent esthetic and therapeutic deficiencies. The point to be made is one for future planning; namely, that a therapeutic atmosphere is conducive to treatment. The patient and the staff both feel it and are encouraged by it. The converse is equally true.

Data have been accumulating lately which tend to show substantially that there are very potent therapeutic forces active in the physical and social situation of a mental hospital ward. These lead to therapeutic advantage or disadvantage dependent upon their recognition by the responsible medical group. Acting-out in the form of assaultive, destructive behavior or suicidal attempts or gestures or escape maneuvers may be encouraged or discouraged by the implications of the prevailing attitude. In those institutions where trust and respect of psychotic patients is explicit in the physical structure as well as the demeanor of the attending personnel, there is a gratifying low incidence of the disturbance colloquially thought to be characteristic of the insane. Obviously the Army hospitals which I saw were limited in this regard.

It has been contended with what appears to be irrefutable logic that unless there is a relatively immediate prospect of restoring a soldier to some kind of duty status, his definitive medical care and ultimate rehabilitation is the job and responsibility of the Veterans Administration. This policy is a clear, simple, and sensible one based on the thesis of division of medical responsibility among various governmental agencies so charged. The military establishment has a vital duty which should not be jeopardized by encumbering its facilities and personnel with obligations which can be discharged by other divisions of the Federal Government. Admittedly, it is a difficult task to draw a sharp line of distinction between the medical obligations which are properly the military's and those which are civilian agencies'; however, since this becomes important only after the patient has left a theater of operations such as Europe, it is beyond the purview of this report.

In theaters of operation such as Europe, the hospitals of necessity have to have provisions for the care and treatment of the psychotic. The creation of a neuropsychiatric center as an area clearing house, such as the one at Landstuhl, streamlines the handling of those patients who for the most part cannot be returned to duty.

The criterion for disposition or return to duty should be based on an estimation of the immediate future effectiveness of the patient as a soldier, and not upon the established psychiatric diagnosis alone. It is well documented that a significant percentage of patients with frank psychoses can be returned to an effective status provided the complex organization of various services required for this are integrated appropriately.

There are additional compelling reasons which recommend this policy:

1. The concept that a diagnosis of psychosis per se is synonymous with separation from the service is extravagant both economically to the nation and medically to the individual. Unfortunately, this idea has prevailed for some time. It is based in part upon the attitude of hopelessness with which many persons view all psychiatric illness. Co-ordinated line and staff policies and actions and improved communication of these among the persons concerned can restore a number of these patients to effective duty.

2. A military medical establishment which concerns itself only with diagnosis and disposition tends to deteriorate professionally. It cannot attract and keep well-trained, competent physicians. Accordingly, failing in this sphere, its other medical and military services deteriorate commensurately.

3. Medical-administrative policies other than this have a demoralizing influence upon military personnel in general, for in efforts to rectify the individual instances of the injustice with which they are personally familiar, there is created a spreading tendency to circumvent regulations and directives conceived of as rigid and unrealistic, by individualized interpretation which tends in turn to make a travesty of policy in general.

4. The most effective policy is one that defines and sets relatively broad limits and allows for the executor of it to use his discretion and judgment. Its emphasis is permissive rather than prohibitive. This ensures full participation and grants authority as well as responsibility.

SEPARATION PROCEDURES

The authority for the administrative separation of unfit personnel is clearly defined by pertinent Army regulations. The problem of the so-called pseudoneurotic schizophrenic whose characterologic

make-up unfits him for military service except in certain extremely protected situations continues to baffle many. The basic nature of this problem eludes many of the less experienced psychiatrists. By the same token, company commanders fail to recognize these persons for what they are and the result is a virtual shuttle of the patient from duty to the hospital and back, with all that that implies. It is significant that in those installations staffed by the more experienced medical officers, who naturally establish a working liaison with the line officers whose troops they serve, this problem is negligible.

PSYCHIATRIC HOSPITALIZATION VERSUS OPD MANAGEMENT

It was gratifying to see that on the whole considerable care is exercised in selecting patients for admission to the psychiatric wards. This shows not only a high degree of psychiatric therapeutic sophistication but also indicates a noteworthy educational achievement. The concept that psychiatric illness is an expression of a decompensation in the adaptive resources of a patient is one which takes many factors into consideration. Further, it emphasizes the functional, dynamic aspects leading to the symptomatic state in contrast to the older static idea which tended to overstress the immediate, current, descriptive expressions of disease in a sense analogous to organic disease. Fitness for duty in this enlightened concept of psychiatric function can be seen as a relative phenomenon, a composite of the resources and potentialities of the patient and the stressful circumstances of the situation in which he finds himself.

It was my impression that there is a prevailing tendency among the psychiatrists in this theater of operations to be less bound by descriptive, nosologic labels which heretofore have carried with them dispositional edict qualities. One gains the impression that on the whole there is a concerted effort to keep patients referred for consultation and possible psychiatric hospitalization on an active duty status if it is at all feasible. Along with this, there is considerable interest on the part of these medical officers to reinforce this decision with provisions for continuing outpatient psychotherapy. Supplemental to this, they feel encouraged to use the ancillary resources at their disposal to accomplish these desirable objectives: consultation with company commanders, suggestions as to duty assignments, and use of chaplain and social service facilities. The encouragement of this is strongly recommended. As a corollary, the creation of some standard on which suitability for treatment may be based is also recommended. This would enable the medical officer to spend that time available for outpatient department psychotherapy more equitably from the point of view of its potential worth to the Army.

The net result of this activity has been that the census on the inpatient hospital services in most installations is at a minimum. Those patients who are admitted are there for evaluative studies, or because a trial of duty has shown conclusively their medical unfitness, or because of complicating factors that clearly warrant hospitalization.

I found few installations with statistical data which truly reflect the large amount of this kind of work being done; unless the patient is formally admitted to the hospital, he does not appear on the daily records as a patient. Obviously, efforts in this direction are very rewarding. They result in a much higher quality of psychiatric care and service than is officially evident in regular hospital reports. A more accurate appraisal of work actually done would be had from some inclusion of these data in the regular forms that are officially submitted.

Then too, it must be evident that this function employs psychiatrists at their most efficient level; their professional acumen and therapeutic skill is enhanced commensurately at the same time that the patients and their units benefit from the use of even partial services. In a peacetime military establishment particularly, this procedure has much to recommend it.

PSYCHIATRIC MEDICAL OFFICERS

The large majority of medical officers assigned to the psychiatric services of the installations I visited had had some graduate training in psychiatry before entering on this tour of duty. The Chiefs of the services of the larger hospitals are board certified or eligible, by virtue of specialized training they have received. Those officers with more junior status expressed keen interest in ultimately qualifying for specialty certification. This, as I see it, attests a degree of motivation which can only reflect beneficially upon their patients. Accordingly, staff conferences and more or less formal reviews of current literature, as well as the actual collection and recording of psychiatric data, are entered into in a highly satisfactory manner. The conferences I was privileged to attend were the equal of any I have witnessed in the better civilian teaching institutions.

Within the limitations of time and resources permitted by the fact that they are in the Army, it was my feeling that the quality of individual patient care being given was of a high order. However, with almost no exception these very capable young officers all plan to leave the Army at the conclusion of their obligated period of service. Also it can be anticipated that in the future the level of preliminary training by officers assuming these responsibilities will be lower than those now serving, and hence their skill proportionately less.

MORALE

The morale of the military forces as reflected in the sample of medical officers whom I met requires discussion. It is not an easy job to assess the morale of any organization, much less one the size and complexity of the United States Army. There always is a tendency to reductionism and oversimplification which ascribes more importance to a few obvious elements then they deserve.

Hanson W. Baldwin, the military affairs analyst for the *New York Times,* recently observed that the morale of the military forces was at "its lowest point in the 25 years" of his firsthand knowledge of it as a reporter. His discussion went on to include a number of the factors which I also noted in my brief and limited contact. It is significant that at the relatively high level of medical officers, one senses the same things which Baldwin indicated are true for the entire military establishment. While certain problems are peculiar to medical officers, it is also true that they too are influenced by the same set of sociologic forces which operate on the Army as a whole.

First, it is evident that—as Baldwin also points out—one must distinguish between the hard core of regular Army and the larger reserve component which finds itself in uniform for a limited time. While not the most paramount, the economic factor is certainly important. This is particularly true of regular officers in the grades of Major, Lieutenant Colonel, and Colonel. The material rewards of a professional life in the service are distinctly below what these men are entitled to, deserve, and could earn as civilians. While they are expected and indeed required to live on a social scale commensurate with their rank, they are not given the wherewithal with which to maintain this, educate their families, entertain as they deem it fit and are required to, and provide insurance for their families. This is made the more intolerable by the disparity which exists between them and their civilian colleagues in positions of comparable authority and responsibility. Then also the perquisites have been whittled down progressively.

The policy has been to create incentives for the lower ranked officers, and while this in itself is fine, unless similarly scaled advantages exist for officers who elect this as a permanent career, the country will be faced with a dearth of trained, experienced, higher echelon leaders. Resignations from the service by higher ranked officers is too high at present, as is generally recognized; however, the reasons for this are not fully appreciated. Medical officers in particular now have available to them civilian positions with emoluments far beyond those which they can hope to achieve by remaining permanently in military service. The effect of this upon their wives and families has to be reckoned with, for therein lies a major source of potential dissatisfaction.

While some recognition of this is indicated by the additional pay given to medical officers, it is not enough. The factors of status and prestige have to be thought of. By tradition, promotions in the Medical Service are geared to line requirements. It has been demonstrated in various state as well as civilian Federal agencies that trained medical personnel have to be paid salaries at a higher level than other civil service positions of comparable status if good medical service is to be had. For example, while the Governors of several midwestern states receive salaries averaging $15,000 per year, the subordinate position of Commissioner of Mental Health in their states carried with it a salary of from $18,000 to $20,000 per year. While it may be hoped that Congress will rectify the relatively low pay scale of the military, efforts should also be made to free what seems to be an encumbered promotion policy.

Since World War II particularly, the military establishment has recognized the rightful place of medical specialists. However, in the higher ranks at a time when maximum returns may be expected from long-term professional investments, it is still necessary for highly trained medical officers to assume full-time administrative responsibilities for which they may or may not be suited and especially trained, if they are to remain in a favorable competitive position in the promotion scale. This seems to be a wasteful expedient. One outstanding consequence from a morale point of view is the rivalry created between those officers who have had specialty training and those who by election or necessity have chosen administrative careers.

The policies of various high-level advisory groups also affect the job of the Medical Service as a whole, as well as its individual officers. Medical staffing patterns seem to be based on troop strength, while the demand for medical services is on the realistic basis of troops *plus* their dependents. In many instances the tax which this imposes is expressed in terms of widespread dissatisfaction by the physician as well as his patient, both of whom feel victimized by "the system."

THE MEDICAL OFFICER'S JOB

In its widest angle perspective, an appreciation of the medical officer's job takes in a great deal far beyond the scope of the actual technical practice of medicine. As I saw it and as I am capable of judging it, the actual quality of medical service being given patients is of a superior kind.

As I have mentioned previously, the staffing ratios of assignments of medical officers to the theater is on the basis of total military strength. It happens, however, that these officers not only serve a reasonably well selected, physically healthy group of

young male adults who are not engaged in actual combat with an enemy, but also their dependents—wives and young children. Consequently, the burden imposed by the medical care of these dependents has to be reckoned with. As is true of women in the most fertile time of their childbearing, in early marriage and when they are relatively young, there are a host of medical, obstetric, gynecologic, and psychiatric problems that occur among them. I have no information which would lead to the conclusion that these are disproportionate. By the same token, however, the whole complex of pediatric and developmental problems of dependent children is also the Medical Service's responsibility.

While I am sure that these are self-evident facts, I have the impression that for reasons not within the control of the Medical Service they tend to be subordinated in importance. The medical officer in general is expected to wear three hats: the first, as a general practitioner with a burgeoning family medical practice; the second, as a field medical officer familiar with and capable of dealing with the problems of an army in the field; and the third, as a competent specialist in one or the other of the many specialized fields in medicine, who is expected to function as he would were he in a teaching hospital. While this summary statement obviously requires modifications and amendments to be wholly accurate, it suffices to point up some of the ramifications and complexities of the medical officer's job. Each facet demands progressively more, in order to more adequately and more completely do the job with which it is concerned. This takes time, training, and leadership, as well as people; and yet it is all couched within the framework of personnel ceilings, military strategy, domestic and foreign political implications, limited medical manpower resources, and financial restrictions.

The solution of the conflicts among these often conflicting demands is neither immediately apparent nor easy, but has to be sought after by everyone involved; this includes many civilian groups whose tendency it has been to divest themselves from responsibility and content themselves with special pleadings for special interests.

CONCLUSIONS

It is manifest that any brief encounter such as mine with problems of the order of magnitude such as those confronting the Medical Service in its European theater is hardly sufficient on which to even entertain an opinion. My respect for the job being done and the people doing it has grown immeasurably as a consequence of this limited view of their operations. Further, this opportunity has made me more conscious of my obligations and responsibilities as a citizen, a physician, and a teacher.

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CASE REPORTS

Dubin-Johnson Syndrome

ARTHUR L. KLATSKY, *Captain, MC, USA*
RICHARD F. HUCK, *Captain, MC, USAR*

SOON after the turn of the century it was realized that certain cases of jaundice could not be explained by the then known diseases of the liver. In 1901 Gilbert and Lereboullet[1] described *la cholémie simple familiale* as a cause of icterus. Although it is probable that some of these were cases of hemolytic jaundice, a certain proportion probably were the entity which has become known as constitutional hyperbilirubinemia. (Other names for this are physiologic hyperbilirubinemia, familial jaundice, constitutional hepatic dysfunction, and familial nonhemolytic jaundice.) In 1941, Dameshek and Singer[2] gave a systematic description of this entity. It has since become well recognized and has been described by others.[3-6] This is a benign hereditary abnormality manifested chiefly by recurrent and/or varying icterus. The bilirubin is primarily of the indirect type. Symptoms may not be present, but, if present, mild fatigue and asthenia are most common. These are correlated with the level of jaundice and are most marked at times of stress, such as intercurrent illness, surgical intervention, or alcoholic excesses. Sulfobromophthalein sodium retention and other liver function tests are normal, as is the rate of red blood cell destruction. The liver and spleen are histologically normal. There is usually no shortening of life expectancy.

In 1954, Dubin and Johnson[7] reported 12 cases of jaundice differing in several important respects from this entity. (1) The bilirubin is primarily direct and is usually in higher concentration (6 to 8 mg per 100 ml in comparison with the usual 2 to 3 mg per 100 ml in constitutional hyperbilirubinemia). As would be expected, biliuria is usual. (2) Symptoms are generally present and are more prominent. Marked fatigue, weakness, nausea, and mild abdominal pain in the epigastrium and in the right upper quadrant are common. (3) A palpable liver is frequently present. (4) Liver function studies may be abnormal. Flocculation tests may be positive, sulfobromophthalein sodium retention may be as high as 15 per cent, and a cholecystogram may show nonfunction of the gallbladder. The more serious consequences of

From U. S. Army Hospital, Fort Campbell, Ky.

disordered liver function, such as increased prothrombin time and hypoalbuminemia, are not present. (5) Specific pathologic changes of the liver are observed. Grossly, the liver is dark brown to black. The consistency may be firmer than normal. Microscopically, there is a coarsely granular brown pigment in the hepatic cells. This is most marked near the central vein and in the central two thirds of the lobule. There is pigment in the Kupffer cells in some cases. The nature of this pigment is unknown, but is reportedly similar to the lipochromes.[8,9] This entity was described independently in 1954 by Sprinz and Nelson.[8] Since then a number of reports of cases have appeared in the literature.[9-12] It is considered likely that this is a definite pathologic entity, probably different from constitutional hyperbilirubinemia.

We should like to report another case of Dubin-Johnson syndrome, proved by liver biopsy and with a familial occurrence (by history).

CASE REPORT

A 22-year-old soldier was admitted to this hospital in November 1955 because of icterus, fatigue, and nausea and vomiting of three to four days' duration.

Past History. The patient stated that he had noticed yellow color in his eyes since the age of 12. This had waxed and waned repeatedly. At the age of 18, he suffered from malaise, nausea and vomiting, and increase in his jaundice. A diagnosis of hepatitis was made. He improved gradually over a period of 3 to 4 months. At the age of 19 years, shortly after entering college, he was operated on for acute appendicitis. The surgeon told the patient that his tissues were yellow at operation. Postoperatively he developed deep jaundice. Liver tests were performed for the first time, and a diagnosis of "recurrent hepatitis" was made. Convalescence again took 3 to 4 months. For the next two years the patient attempted working at several jobs and he once more entered college. Each endeavor was terminated because of weakness, fatigue, and lack of energy.

He was drafted in June 1955 at the age of 22 years. He felt fairly well during basic training but shortly thereafter he once more became very fatigued and weak. He developed a "funny, pulsating feeling" in the right upper quadrant, nausea, vomiting, and increased icterus, and was admitted to the hospital for study.

Family History. Family history revealed that the patient's father, age 47 years, had suffered from chronic jaundice and had been told that he had "chronic hepatitis." One sister, 23 years of age, also had "chronic hepatitis." Both were fatigued but were able to work regularly (as

train brakeman and school teacher, respectively). Another sister, 18 years of age, was normal.

Physical Examination. The patient was a well-developed and well-nourished young man. His temperature was 99.4°F; pulse rate, 80; blood pressure, 115/75 mm Hg; and respirations, 22 per minute. The scleras were icteric; the skin was not thought to be jaundiced. Physical examination was otherwise entirely negative. At no time was either the liver or spleen palpated.

Laboratory Studies. White blood cell count was 7,800 per μl with a differential of 59 polymorphonuclear leukocytes, 28 per cent lymphocytes, 8 per cent monocytes, and 5 per cent eosinophils. Hematocrit was 44 ml per 100 ml; sedimentation rate, 9 mm at the end of the first hour. The direct bilirubin was 2.8 and the total bilirubin 4.0 mg per 100 ml. The sulfobromophthalein sodium retention was between 8 and 15 per cent. Cephalin-cholesterol flocculation varied from 1 to 2 at 48 hours; thymol turbidity, from 1.5 to 4.4 units at 48 hours. Bile was present in the urine and urine urobilinogen was 1:40. Prothrombin time was 100 per cent of normal. Total protein was 6.5 grams per 100 ml with albumin-globulin ratio of 3.6:2.8. Alkaline phosphatase was 4 units; cholesterol was 283 mg per 100 ml, with 70 per cent of the total as esters. Reticulocyte count was less than 1 per cent of the erythrocyte count; Coombs' test was negative.

Roentgenographic findings of the chest were negative. Cholecystograms failed to demonstrate gallbladder filling on two trials.

Course in Hospital. The initial diagnosis was thought to be chronic hepatitis. The patient seemed to be fairly comfortable on the ward and his appetite was good. His temperature varied from normal to 99.4°F. There was no change in status over several months in the hospital. An attempt at obtaining a needle biopsy specimen of liver tissue was unsuccessful. Accordingly, on 3 May 1956, a limited laparotomy was performed for the purpose of obtaining a liver biopsy. The operator described the liver as, "of normal size, but bluer than usual. The lower margin had a blunt rounded edge. Other organs were normal. On cutting, the liver had a firmer, more rubbery consistency than usual." The microscopic description was "normal cellular pattern with microscopic brownish pigment in the liver cells around the central veins and also in the connective tissue and Kupffer cells." The diagnosis of Dubin-Johnson syndrome was confirmed by the Armed Forces Institute of Pathology.

The patient was discharged from the service as unfit for duty.

COMMENTS

This particular patient emphasizes, again, the importance of adequate (family) history evaluation in clinical medicine. The

strong familial history of jaundice, the patient's story of recurrent icterus for several years, malaise, normal hemogram, and borderline normal liver function point strongly to the diagnosis of Dubin-Johnson's syndrome or the separate entity known as constitutional hyperbilirubinemia. It is stressed that at present the two entities are thought to be distinct, both pathologically and clinically, the former having both an elevated total and direct serum bilirubin with the characteristic pigment in the liver. A review of the literature indicates that the hereditary factor is not nearly as evident in Dubin-Johnson's syndrome as in constitutional hyperbilirubinemia.

In the differential diagnosis, subacute hepatitis or postnecrotic cirrhosis of chemical or viral cause should be considered. In these diseases an enlarged nodular liver and positive flocculation studies indicate a pathologic as well as functional change found in the liver. The liver is not significantly enlarged nor are the flocculation studies typically positive in the syndromes considered in this article.

The minimal jaundice, right upper quadrant discomfort, fever, and roentgenographic evidence of a poorly or nonfunctioning gallbladder may lead to the erroneous diagnosis of primary gallbladder or bile duct disease. The history and liver biopsy demonstrating the abnormal pigment would be diagnostic of hepatic dysfunction of the Dubin-Johnson type. In constitutional hyperbilirubinemia, the gallbladder may be seen in the cholecystogram.

The hepatic dysfunction syndromes ordinarily should not be confused clinically with a hemolytic process of a hereditary or acquired type, because the hemogram, red blood cell fragility study, Coombs' test, and reticulocyte determinations are well within normal limits. Also, in hemolytic disease, the spleen is frequently palpable.

Needless to say, the cause of hepatic dysfunction of the Dubin-Johnson type or of constitutional hyperbilirubinemia is unknown. A hereditary factor is probably important, particularly in the latter condition. The conditions seem to be more prevalent in men than in women. It is remarkable that the pigment peculiar to Dubin-Johnson's syndrome has not been described at post-mortem examination heretofore.[13]

No specific treatment is known at present. Cortisone has been tried in constitutional hyperbilirubinemia without success.[5] The rationale of this therapy was based on the fact that corticosteroids are known to decrease jaundice in acute viral hepatitis.

Prognosis in both types of hepatic dysfunction is considered to be good with respect to life expectancy. Certainly, the symp-

toms of a recurrent nature can limit an individual's activity at least temporarily and may impose permanent physical limitations. From the cases studied to date, subsequent irreversible liver cell damage in later life has not been demonstrated.

SUMMARY

The Dubin-Johnson syndrome is believed to be a distinct disease entity in which there is hyperbilirubinemia, manifested clinically as a form of chronic or intermittent jaundice. Histologically the disease is characterized by the presence of a coarsely granular brown pigment in the hepatic cells. The usual symptoms are abdominal pain, nausea, and fatigue. Jaundice, dark urine, and slight enlargement of the liver are usually present. The jaundice is aggravated by intercurrent illnesses and fluctuates in intensity. The prognosis is good.

The disease differs from constitutional bilirubinemia in that (1) the symptoms are more prominent; (2) the liver is frequently palpable; (3) bilirubinemia is more severe and the serum bilirubin gives primarily a direct van den Bergh reaction; (4) bilirubinuria is more common; (5) liver function tests, such as sulfobromophthalein sodium excretion, cephalin-cholesterol flocculation, and turbidity tests may be abnormal; (6) the gallbladder may not be seen in a cholecystogram; and (7) there are specific pathologic changes in the liver.

The diagnosis of Dubin-Johnson syndrome in the patient described in this report was proved by liver biopsy. History disclosed a familial occurrence.

At present the primary importance of this syndrome is that it be accurately differentiated from (1) chronic and subacute hepatitis, in order that the patient may be assured of a good prognosis, and from (2) obstructive jaundice, in order that unnecessary surgical procedures may be prevented.

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HELPING THE DISTURBED

"The main characteristic of mental ill health is inability to bear experience. The condition which takes the distressed human being to the psychiatrist is fundamentally the same as that which takes him to the priest or to the philosopher, and it is legitimate and important to compare what each has to offer to the disturbed mind.

"The psychiatrist today is equipped, as doctors fifty years ago were not, with techniques for uncovering the origin and nature of mental stress; with theories to mitigate its unbearable quality; and with drugs to blunt its physical effects. He is less well equipped with means, physical or psychological, for raising the threshold of what can be borne with impunity."

—SIR GEOFFREY VICKERS, V. C., M. A.
in *Lancet*
p. 523, March 12, 1955

Constitutional Hepatic Dysfunction

NICHOLAS H. ZELLER, *Captain, MC, USA*
GERD SCHLEEF, *M.D.*

THE icteric condition which today is recognized as constitutional hepatic dysfunction or familial nonhemolytic jaundice was first described by Gilbert and his associates[1] during the early 1900's, and called *cholémie simple familiale*. Rozendaal, Comfort, and Snell,[2] in an analysis of cases of slight and latent jaundice, included instances of familial nonhemolytic, nonobstructive jaundice.

Subsequent reviews of the condition were published by Comfort[3,4] and Comfort and Hoyne,[5] who delineated the criteria for diagnosis and included a clinical study of 35 cases. It was stressed that the jaundice is not due to disease of the blood, liver, or biliary tract, but apparently is caused by an abnormally high threshold for excretion of bilirubin formed at the usual rate. This was attributed to an inborn deficiency of the hepatic cells with respect to the excretion of bilirubin. Comfort proposed the term constitutional hepatic dysfunction as best indicating the nature of the condition and the organ involved. In 1947 Meulengracht[6] reported 35 cases of chronic, intermittent jaundice which conformed to the entity under discussion.

The sole manifestation of the condition is jaundice, which may become apparent at any age, and which may be intermittent or persistent. It is usually familial, but cannot always be demonstrated to be so. When familial, it is believed that the condition is inherited as a dominant Mendelian trait which may be carried by either sex.[7] It is not common, but the exact incidence has not been determined. The elevated blood bilirubin is always indirect reacting. In 1941 Dameshek and Singer[7] reported a greatly delayed excretion of injected bilirubin during bilirubin excretion tests in two families with familial nonhemolytic jaundice.

Constitutional hepatic dysfunction apparently does not produce symptoms, but it is usual for individuals with the condition to complain of neurasthenia and fatigability.[3-5,7] Emotional stress has also been related to appearance or exacerbation of icterus in affected individuals.

From U. S. Army Hospital Berlin, Berlin, Germany. Dr. Zeller is now at 1113 East Cherokee, Springfield, Mo.

The diagnosis is usually one of exclusion. Initially, following the report of an elevated indirect reacting bilirubin, the patient is usually thought to have hemolytic disease. This can be excluded by history; a normal-appearing bone marrow; an absence of anemia, reticulocytosis and splenomegaly; normal size, shape, and osmotic fragility of erythrocytes; a negative Coombs' test; a normal erythrocyte survival time, and a lack of increased excretion of fecal and urinary urobilinogen. A normal excretion of fecal urobilinogen may be the only means of distinguishing constitutional hepatic dysfunction from a mild hemolytic process without demonstrable anemia.

Hepatic disease is ruled out by history, absence of hepatic enlargement, normal hepatic architecture on histologic examination when liver biopsy is performed, and normal liver function studies (other than the bilirubin excretion test), including sulfobromophthalein sodium excretion test.

The jaundice of gallbladder disease and other intra- or extrahepatic biliary obstruction is associated with an increase in the direct reacting bilirubin in the serum, and with other characteristic features of disease of the biliary tract.

A condition of nonhemolytic hyperbilirubinemia associated with lipochrome-like pigment in the liver cells has been reported.[8,9] In addition to the pigment desposits noted, the bilirubinemia is characterized by a relatively high direct reacting fraction, and a mild elevation of the sulfobromophthalein sodium retention.

Accurate diagnosis of constitutional hepatic dysfunction or familial nonhemolytic icterus is essential. An erroneous diagnosis of liver or biliary tract disease might lead to unnecessary exploratory surgery, prolonged period of hospitalization, duty limitations, or even dismissal from the service, whereas a diagnosis of hemolytic disease may be followed by unnecessary and useless splenectomy.

The prognosis is excellent and life expectancy is not affected. No specific treatment is indicated. Explanation to the patient of the benign nature of the condition is often sufficient to remove many of his functional complaints.

CASE REPORT

A 28-year-old white Puerto Rican was admitted to this hospital on 26 February 1956. He stated that he felt well until about five days prior to admission when he noticed onset of headache, anorexia, and weakness of his legs. He experienced chilly sensations and a "feverish feeling" about two days before admission. He thought his urine had

become darker in color about two days before entry, but noticed no change in color of his stools. On the day before admission he was told his skin was yellow. He had no nausea, vomiting, or abdominal pain. He had received a routine influenza inoculation in November 1955.

Past History. The patient was told in 1953 that he was jaundiced. He stated that his skin never cleared up although he never felt as bad as he did on admission. He had been under the care of a psychiatrist as an outpatient at his present duty station for treatment of a chronic anxiety neurosis, and since April 1955 had been receiving reserpine daily. A fellow member of the patient's service company had been hospitalized shortly after the patient's admission with a subsequently substantiated diagnosis of infectious hepatitis. The patient had been a worker in a watch-crystal factory prior to entering the Army in 1951. He served in Korea during 1951-1952, and had been in his present command for about one year. He denied alcoholic intake or exposure to possible hepatotoxins or hemolytic agents. He denied any history of jaundice or liver trouble among members of his family. He is the second of eight siblings, all of whom are living and well.

Physical Examination. The patient was a fairly well-developed and nourished white male who did not appear ill. He was alert, but tense and apprehensive. His temperature was 99°F; blood pressure, 110/60 mm Hg; pulse rate, 80 per minute. There were no abnormal physical findings other than moderate icterus of the scleras and skin. There was no enlargement of any abdominal organ. There were no stigmata of chronic liver disease. Digital rectal examination revealed a small amount of brown stool.

Laboratory Studies. The leukocyte and differential counts were normal. Hemoglobin was 14.3 grams per 100 ml; hematocrit, 43 ml per 100 ml; corrected sedimentation rate, 20 mm in 1 hour. Routine urinalyses were negative for sugar and albumin, and negative microscopically. The microflocculation test for syphilis was negative. Serum amylase, fasting blood sugar, blood urea nitrogen, and prothrombin time were all within normal limits. The heterophile antibody titer was 1:14; Coombs' test, negative; reticulocyte count, 1.5 per cent of erythrocyte count. Erythrocyte fragility studies showed: beginning hemolysis at 0.44 per cent NaCl, complete hemolysis at 0.30 per cent NaCl; control, beginning hemolysis at 0.42 per cent NaCl, complete hemolysis at 0.32 per cent NaCl. Total serum proteins were 7.5 grams per 100 ml with an albumin-globulin ratio of 5.1:2.4; initial serum bilirubin, 5.25 mg per 100 ml, with an indirect or delayed component of 5.02 mg per 100 ml; serum cholesterol, 236 mg per 100 ml, with an esterified fraction of 72 per cent; alkaline phosphatase, 2.2 Bodansky units; thymol turbidity, 2.3 units; cephalin-cholesterol flocculation, negative at 48 hours. There was 2.5 per cent retention of sulfobromophthalein sodium 45 minutes after intravenous injection of 5 mg per kilogram of body weight. Urinary urobilinogen was 1 Ehrlich unit in a 2-hour afternoon specimen. Fecal urobilinogen excretion was 105 mg per 24 hours. Tests for

urinary porphobilinogen and uroporphyrin were negative. A bilirubin excretion test revealed 85 per cent retention 4 hours after injection of 50 mg of bilirubin intravenously, as compared with a normal retention of less than 5 per cent. Serial liver function studies during the period of hospitalization were always normal except for an elevation of the serum bilirubin, which varied between 1.6 and 3.15 mg per 100 ml, the increase always being in the indirect fraction.

Roentgenographic findings of the chest were within normal limits, and a cholecystogram revealed a normally functioning gallbladder.

Course in Hospital. The patient remained afebrile throughout the period of hospitalization. He was treated as for hepatitis until it was known that the laboratory studies were typical of constitutional hepatic dysfunction or familial nonhemolytic jaundice. Thereafter, he received no specific treatment and was returned to full duty on 27 March. Unfortunately, circumstances prevented any investigation into the possible occurrence of this condition among other members of the patient's family.

On 13 April, the patient was readmitted to this hospital in an acute exacerbation of his chronic anxiety state. All laboratory studies were again within normal limits except for a slightly elevated serum bilirubin of 1.4 mg per 100 ml, with an indirect fraction of 1.25 mg per 100 ml. It is interesting to note that the serum bilirubin value was only slightly above the normal at a time when the symptoms of the patient's anxiety state were most prominent.

SUMMARY

Constitutional hepatic dysfunction is a benign and relatively asymptomatic disease. The only manifestation of the condition is intermittent or persistent jaundice, which may become evident at any age. It apparently is caused by an abnormally high threshold in the hepatic cells for the excretion of bilirubin formed at the usual rate.

The only abnormal physicial finding is the jaundice. Hyperbilirubinemia, from an elevated indirect reacting bilirubin, is the only abnormal laboratory finding. On histologic examination the liver tissue appears normal.

No specific treatment is indicated and the prognosis is excellent. Accurate diagnosis of constitutional hepatic dysfunction is essential to prevent unnecessary exploratory surgery or splenectomy, prolonged hospitalization, duty limitations, or even discharge from the service.

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HEPATIC COMA

"The relationship between ammonia intoxication and impending hepatic coma, and even deep coma, produced by protein and other nitrogenous substances such as ammonium chloride, is by no means clear. It is true that some patients have a high venous blood level of ammonia when hepatic coma develops, but the relation is not yet distinct nor constant enough to imply an etiological relationship. The empirical fact remains that, in certain patients, hepatic coma may be induced by protein, whatever the biochemical defect may be."

—CHARLES S. DAVIDSON, M. D.
in *Journal of American Medical Association*, p. 391, Feb. 4, 1956

Unique Renal Trauma

ANTHONY A. BORSKI, *Major, MC, USA*

THE traumatic severance of a renal artery which is presented here is unique in that no other major organs were involved and no ribs were fractured. Moreover, the kidney remained grossly intact during the trauma to its pedicle. Search of the literature failed to reveal a similar case. Previously reported cases of lacerated renal vessels had other organs involved and ended fatally. In the present case the severed renal artery was not diagnosed preoperatively.

CASE REPORT

An 18-year-old soldier was admitted to this hospital at 0900 hours on 1 February 1955 complaining of pain in the left flank and left side of his chest. The patient stated that he had jumped from a slow moving truck, slipped, and fallen under the vehicle. His screams caused the driver to apply the brakes; however, the forward momentum of the truck pushed him several feet along the snow-covered road as the rear wheels compressed the left side of his body. No treatment was received prior to admission to this hospital.

Physical examination revealed a well-developed and ambulatory patient. His blood pressure was 124/74 mm Hg; pulse, 80; respiration, 20; temperature, 98.2°F. The thorax was symmetrical and well developed. There were several superficial abrasions over the left lateral thorax. The abdomen was soft and slightly tender in the left upper quadrant. There were no palpable masses. Peristalsis was normal. There was moderate tenderness and questionable bulging in the left flank. A few superficial abrasions were noted over the left flank. No other abnormalities were noted on physical examination.

A roentgenogram of the chest did not reveal evidence of any fractured ribs. The lungs were clear except for the left base where there were some signs of pneumonitis. There was no free air under the diaphragm.

A white blood cell count showed a total of 15,600 cells per μl, with a differential count of 85 per cent neutrophils, 11 per cent lymphocytes, and 4 per cent eosinophils. Red blood cell count was 4,500,000 per μl; hemoglobin, 14 grams per 100 ml; and hematocrit, 44 ml per 100 ml. Urine was normal.

From 121st Evacuation Hospital, Korea. Maj. Borski is now assigned to Fitzsimons Army Hospital, Denver, Colo.

The patient was admitted to the surgical service for observation for possible splenic injury. Approximately 10 hours following admission his blood pressure started to rise, and 12 hours following admission it was 210/105 mm Hg and his pulse was 120. He had emesis and diaphoresis, and the tenderness and bulging increased in the left flank. A urologist was consulted. His findings were essentially as already described but the flank mass was interpreted as due to renal injury and therefore an intravenous urogram was taken (fig. 1). There was no apparent renal function on the left and the psoas outline was absent on the left. The bladder appeared normal on cystoscopy and clear urine

Figure 1. Intravenous urogram showing normal renal function on the right. Contrast media and renal outline are not visible on the left.

was spurting from the right ureteral orifice but there was no efflux from the left. A ureteral catheter was passed to the left renal pelvis but no urine was obtained. A left retrograde urogram revealed a normal left calyceal outline (fig. 2).

We were, therefore, confronted with a patient who had a nonfunctioning left kidney with a normal calyceal outline. The kidney was de-

pressed and the psoas muscle outline was obliterated. There was marked bulging of the left flank which was interpreted as due to hemorrhage. Surgical intervention was undertaken using a transthoracic approach. When the diaphragm was incised, a large collection of blood was noted. Approximately 1,500 ml of blood was evacuated. The kidney appeared grossly normal and the capsule was intact, but there was no pulsation at the pedicle. Examination of this region showed a 4-cm segment of a large vessel with a ragged end attached to the kidney. There was but one intact vessel to the kidney, namely the vein. The surgeon, confronted with a severed renal artery, quickly clamped and

Figure 2. Retrograde urogram showing a normal left calyceal outline. Residual contrast media from intravenous urogram faintly outlines the right kidney.

divided the ureter and vein and removed the kidney. There was a very small segment of renal artery attached to the aorta which was clamped and ligated. The peritoneal cavity was explored and the spleen and intestines were found to be intact.

Blood pressure returned to normal levels on the third postoperative day. The postoperative course was uneventful except for a small col-

lection of pleural fluid which was aspirated on the fourteenth postoperative day. A roentgenogram of the chest taken one month after discharge from the hospital revealed normal findings and the patient was asymptomatic.

DISCUSSION

This case presented several puzzling aspects. Initially, splenic or renal injury was suspected. The presence of intact ribs, normal urinalysis, blood studies, and vital signs, and the absence of a definite mass in the left flank contributed to a later impression of contusion of the thorax and left flank. The benign symptoms and normal laboratory findings led the physician to omit obtaining on admission an abdominal roentgenogram of the kidneys, ureters, and bladder (KUB), and an intravenous urogram. Ten hours following admission the patient apparently had considerable hemorrhage, as evidenced by the physical and operative findings.

Preoperatively we interpreted the hypertension as most likely due to adrenal damage and the depression of the kidney by the suprarenal mass (blood). The source of the blood was believed due to a laceration of the renal cortex without injury to the calyces or pelvis. The cause of the nonfunctioning kidney was unknown but reflex anuria secondary to renal trauma or obstruction of the renal vein or artery by an embolus were possibilities. Displacement of the kidney in such a manner as to cause compression of the pedicle would have produced an abnormal retrograde urogram. Aortography was not feasible because of the flank mass. The transthoracic approach was used for better exposure and also to fully evaluate the spleen and abdominal viscera. In retrospect, it is believed that the proximal segment of the renal artery went into vasospasm immediately after the severance of the artery, and it was only after a delay of about 10 hours that secondary hemorrhage occurred. It is amazing that the compressing force of the injury could selectively cause severance of the renal artery without rupture or distortion of the renal parenchyma.

CONCLUSIONS

A nonpenetrating injury may sever the renal artery without involving other organs or producing lacerations of the renal parenchyma. This must be considered in the differential diagnosis when (1) signs of internal hemorrhage are present, (2) an intravenous urogram reveals a nonfunctioning kidney, and (3) a retrograde urogram outlines a normal pelvis and calyces.

Homozygous Hemoglobin C Disease

Relation to Military Service

ROBERT D. GENS, *Captain, USAF (MC)*

SINCE the demonstration by Pauling and associates[1] that normal human hemoglobin and sickle cell hemoglobin differ in electrophoretic mobility, it has been possible by the use of electrophoresis to identify a series of abnormal human hemoglobins. Research in this area was at first slow, because electrophoretic identification of abnormal hemoglobins was made with the cumbersome and costly Tiselius apparatus. Recently, however, the development of filter paper electrophoresis has permitted the rapid and inexpensive identification of a patient's hemoglobin type, with the result that in many laboratories, including our own, electrophoretic identification of a patient's hemoglobin type is a routine procedure when studying a patient for a suspected hereditary anemia.

The purpose of this article is to discuss the signs, symptoms, and laboratory findings of a patient with homozygous hemoglobin C disease and to relate these findings to the patient's service desirability.

CASE REPORT

A 22-year-old Negro airman was recently admitted to our hospital with a laceration of his right thigh. He denied any history of jaundice, fatigability, joint or bone pain, or leg ulcers, and there was no family history of these abnormalities.

Physical examination revealed a well-nourished, well-developed man with no evidence of pallor or jaundice. His fingers were of normal size, and there was no evidence of leg ulcers. The spleen was firm, with a sharp edge that was palpable 12 cm below the left costal margin. The liver was not palpable. The remainder of the physical examination was noncontributory.

Laboratory studies showed that hemoglobin was 10.5 g/100 ml; hematocrit, 29 ml/100 ml; erythrocyte count, 3,540,000/μl, with 12 per cent reticulocytes; direct antiglobulin test, negative; sickle cell prepa-

From U. S. Air Force Hospital, Eglin Air Force Base, Fla.

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ration, negative; total serum bilirubin, 0.8 mg/100 ml. A peripheral blood smear showed marked anisocytosis and poikilocytosis with some polychromatophilia; approximately one half of the erythrocytes were target cells and an occasional spherocyte was present; 2.2 per cent of the hemoglobin was alkali resistant (the upper limit of normal for our laboratory). Osmotic fragility[2] showed a marked increase in resistance of the erythrocytes to hypotonic saline solution. Roentgenograms of the skull and chest showed no abnormalities.

The filter paper electrophoretic pattern (using the method of Smith and Conley[3]) is shown in figure 1. All of the patient's hemoglobin is

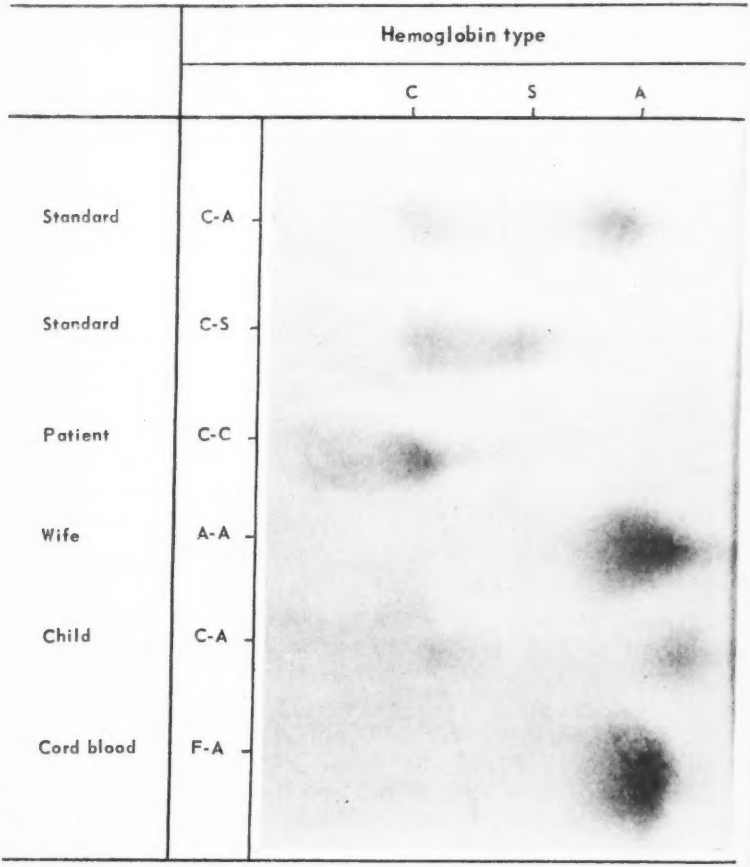

Figure 1. Paper electrophoresis. Hemoglobin C migrates the slowest and hemoglobin A (normal) the fastest, with hemoglobin S (sickle cell) intermediate in speed of migration.

seen to reside in the C fraction, while his wife is homozygous for hemoglobin A. Their child is, of course, heterozygous for hemoglobins C and A.

DISCUSSION

Hemoglobin C was first described by Itano and Neel.[4] It is transmitted genetically as a simple Mendelian dominant and has been estimated to occur in about three per cent[5] of the Negro race. The occurrence of homozygous hemoglobin C disease in the American Negro is approximately 1 in 6,000.[6] A combination of hemoglobin C and hemoglobin A is clinically benign and is manifested by an altered electrophoretic pattern and leptocytosis (target cells). Neither anemia nor splenomegaly have been reported in this heterozygous state.

The patient's splenomegaly, mild anemia, increased erythrocyte production, and leptocytosis are typical of homozygous hemoglobin C disease, in which the life span of the endogenous erythrocytes is known to be markedly diminished.[7,8] Although bone and joint pain symptoms are occasionally described,[9] there are no reports of abdominal pain, hemolytic crises, or splenic infarction in patients with this disease. Characteristically, they experience little distress while pursuing sedentary occupations.

This patient's spherocytosis is in accord with previously noted findings in homozygous hemoglobin C disease.[10] We believe the spherocytosis may be related to his splenomegaly, perhaps indicating "hypersplenism."

At present the patient is associated with a food service squadron, but we believe that a more rigorous life might produce clinical symptoms of anemia. Furthermore, splenomegaly predisposes him to splenic rupture via mechanical trauma. This factor might indicate the need for splenectomy, although splenectomy would not, of course, ameliorate the genetically determined hemolytic process. Discharge from the service should be seriously considered.

The literature concerning splenic rupture and hypoxemia[11,12] is pertinent to this airman, and our experience with him in an altitude chamber will be reported elsewhere.

SUMMARY

A case of homozygous hemoglobin C disease is reported, and the possible military disposition of the patient is discussed.

ACKNOWLEDGMENT: I am indebted to Dr. Barkley Beidleman, 1750 N. Palafox St., Pensacola, Fla., for the electrophoretic study.

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"Human knowledge probably will always be incomplete. It increases through the years and we are encouraged by what is called progress. But in our eagerness to advance, we must not look upon each forward step as having reached the ultimate goal. Nor should we, without proper reservations, be hurried into embracing immature ideas and practices."

—ROBERT L. LEVY, M. D.
in *Journal of Chronic Diseases*
p. 338, Oct. 1956

Meconium Ileus

With Cystic Pancreatic Fibrosis and Early Pulmonary Complications

MELVIN E. JENKINS, *Captain, USAF (MC)*
EVAN W. SCHEAR, *Major, USAF (MC)*

FOR FOUR months we have had under observation a female infant who has manifested cystic fibrosis of the pancreas since birth. A successful operation for complete intestinal obstruction due to meconium ileus was performed at 23 hours of age. Her subsequent development, at six weeks of age, of the most typical early respiratory complication of this disease, lobar atelectasis, prompted this report.

CASE REPORT

A full-term white female newborn infant was delivered uneventfully on 13 March 1956, although some difficulty had been anticipated because of a rapidly progressing polyhydramnios in the mother, a 39-year-old multipara. There was no family history of congenital anomalies. Two half-siblings had shown no evidence of cystic fibrosis of the pancreas.

After delivery, induced by Pitocin (brand of oxytocin), the infant became moderately cyanotic and somewhat lethargic. An occasional cry was weak and "cephalic-like." The abdomen seemed large. Birth weight was six pounds, two and one-half ounces. The circumference of the head was 14 inches; of the chest, 11¾ inches; and of the abdomen, 14 inches. The head appeared unusually large for so small an infant; however, no bulging or even tenseness of the anterior fontanelle was noted. The lung fields were relatively clear to auscultation, and no cardiac murmurs were elicited. The abdomen, despite being obviously distended, was soft and exhibited a peculiar doughy sensation on palpation. No neurologic findings were apparent excepting moderate muscular weakness.

A nasal catheter was passed to the stomach without difficulty, and a thermometer was inserted rectally. Roentgenograms of the abdomen at two and three-fourths hours of age revealed a small air bubble in the stomach with no gas shadows distal to the pylorus.

From 6110th U. S. Air Force Hospital, APO 710, San Francisco, Calif.

The red blood cell count was 5,470,000/μl and hemoglobin was 17.9 g/100 ml.

The infant was watched closely for the next 18 hours, during which time no meconium was passed and the abdominal distention increased. However, there was no vomiting of mucus or detectable drooling. Her general condition remained only fair with mild cyanosis of the hands and feet and moderate weakness. Repeat roentgenograms at 19 hours of age (fig. 1) revealed a complete lower bowel obstruction, making immediate operation mandatory. Surgical exploration of the abdomen at 23 hours of age revealed meconium ileus. Viscid meconium was present throughout the small intestine from the mid-jejunum to within one inch of the cecum, the colon appearing cordlike. Since the process seemed to involve so lengthy a segment of small bowel, resection was deemed impractical.

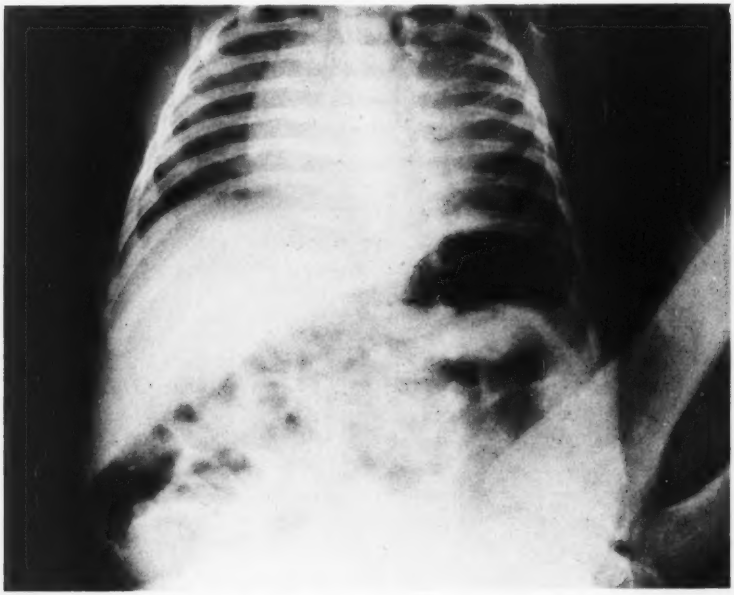

Figure 1. Roentgenogram of abdomen at 19 hours of age demonstrating dilated duodenum and jejunum. No large-bowel shadows are seen.

Enough of the meconium to relieve obstruction was removed with considerable difficulty through six enterotomy incisions, and a concentrated suspension of pancreatin was instilled during closure of the jejunum and ileum. The infant tolerated the lengthy procedure well. During the first 52 postoperative hours, continuous gastric suction was applied, and she was maintained on whole blood plus parenteral fluids and vitamins. Prophylactic antibiotics consisted of

60 mg (100,000 units) of aqueous sodium penicillin G given every eight hours and 100 mg of streptomycin sulfate given intramuscularly every 12 hours.

On the third postoperative day a thin plug of whitish-gray meconium was passed rectally, after which moderate amounts of dark meconium followed at the rate of four to five stools per day. Gastric suction was discontinued on the third postoperative day and small amounts of glucose in water by mouth begun. Within eight hours of the start of glucose feedings, 5 ml of a weak Olac formula was accepted and tolerated well. The formula was continued every two hours and increased to 15 ml per feeding within 24 hours; 0.3 gram of pancreatic extract twice daily was given in the formula.

The infant's progress was steadily uphill after feedings were initiated. She quickly became much stronger and exhibited no adverse findings. She was discharged on the 15th postoperative day, to be followed weekly in view of the possibility of cystic fibrosis of the pancreas. For the first two weeks following her discharge from the hospital the patient seemed to progress well in weight gain, appetite, and general appearance. A dry, hacking cough with some wheezing developed at four weeks of age. At this time the infant was placed on a regimen of 50 mg of Terramycin (brand of oxytetracycline) every six hours and an expectorant cough mixture. Her formula was still being supplemented with vitamins and pancreatin. After improvement of the initial upper respiratory infection, pancreatin was stopped and daily examination of stools for trypsin showed an absence of this enzyme.

At the age of six weeks the infant developed an episode of marked respiratory difficulty with what was described by the mother as a bluish discoloration of the skin. Physical examination at this time revealed an acutely ill infant who appeared in marked respiratory distress with obvious cyanosis and dehydration. There were crepitant and harsh rales throughout both lung fields with dullness to percussion over the right side of the chest. There was moderate subcostal retraction on inspiration. Roentgenograms revealed a pneumonic infiltration of the upper right lobe with evidence of segmental or lobar atelectasis (fig. 2). The infant was hospitalized and placed in an oxygen tent during the first week, taking nourishment poorly and requiring fluids intravenously. Antibiotic therapy consisted of 148.7 mg (150,000 units) of procaine penicillin G twice daily for 10 days and 100 mg of streptomycin sulfate every 12 hours for 12 days.

After the eighth hospital day gradual clinical improvement began. A follow-up roentgenogram on the ninth hospital day revealed complete clearing of the pneumonic and atelectatic processes.

Follow-up examination at four months of age revealed the infant to be progressing satisfactorily. She was on 50 mg of prophylactic

Terramycin twice daily. Her diet consisted of a full-strength Olac formula, rice cereal, bananas, strained meats, and a few strained fruits. She was taking multivitamins, in about four times the recommended daily dosage, and 0.2 gram of ferrous sulfate daily. Pancreatin was being continued (0.3 gram twice daily). At six months of age the patient was progressing fairly well in California, the family having returned to that state. However, pulmonary problems requiring medical care were evident.

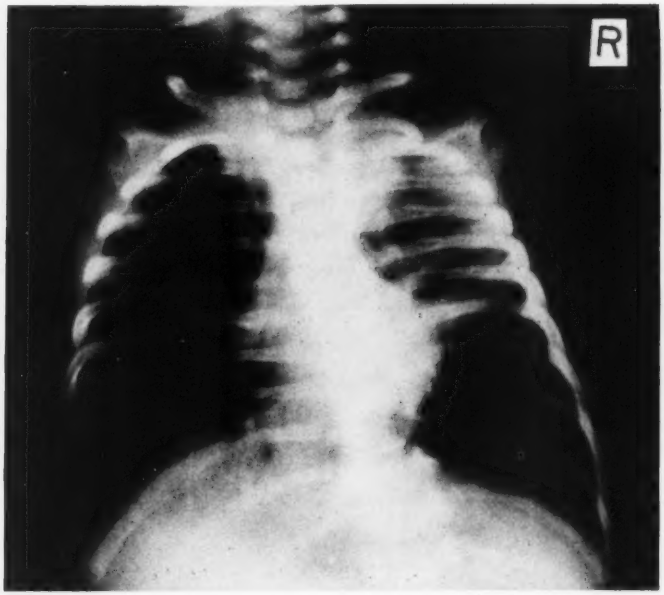

Figure 2. Roentgenogram of chest at six weeks of age revealing an opacity in the upper right lung field with narrowing of rib interspaces.

DISCUSSION

The case presented above demonstrates the earliest manifestation of cystic fibrosis of the pancreas: meconium ileus. The symptoms of meconium ileus are essentially the same as those of any other form of obstruction of the lower small intestine in the newly born infant.

It is interesting that the obstetrician noted an unusually enlarged abdomen in the infant at birth. Initial roentgenograms of the abdomen at three hours of age revealed a gas pattern in the stomach only, interpreted by the radiologist as representing some form of intestinal obstruction.

Despite a 2½-hour abdominal operation at 23 hours of age, entailing repeated manipulations of the small bowel and its mesentery, the infant's response postoperatively was satisfactory. In view of the observations that a few patients pass the obstructing meconium plug spontaneously after two or three days,[1] one might delay operation in those patients with one or more siblings who have likewise had manifestations of cystic fibrosis of the pancreas. However, it must be kept in mind that the longer operation for intestinal obstruction in the newborn period is delayed, the more poorly these procedures are tolerated in general.

The episode of pneumonia and lobar atelectasis at six weeks of age is not unusual. In fact, lobar atelectasis with obstructive emphysema occurs in about 10 per cent of patients with cystic fibrosis of the pancreas.[2] It usually appears in early infancy during the first episode of pulmonary involvement and typically affects one or more lobes of the right lung. The condition is quite serious and may be rapidly fatal. Bronchoscopy and bronchial aspiration through a tracheotomy tube are usually ineffective.[2] Successful treatment of lobar atelectasis in this disease depends upon the intensive use of antibiotics and adequate nursing care.

An early fatal termination is not inevitable in cystic fibrosis of the pancreas if adequate therapy, including a dietary regimen, is given, although the prognosis is still poor for those patients who develop respiratory infections in the first two or three months of life. A high-caloric diet is recommended in view of the associated poor nutrition. Proteins are well tolerated, although poorly utilized. A high-protein diet—10 to 12 grams per kilogram of body weight—is usually recommended for young infants. Fats should be given sparingly with the essential fatty acids being supplied by egg yolk or peanut butter. The carbohydrate intake should be high, chiefly to furnish needed calories. Vitamins A and D as supplements are required in about four times the usual dosages. Pancreatin is probably not needed after adequate nutritional progress has been established.

As a rule, prophylactic chemotherapeutics and/or antibiotics decrease the frequency and severity of respiratory infections. The administration of Gantrisin (brand of sulfisoxazole) in one fourth to one half the therapeutic dose will usually prevent the occurrence or progress of pulmonary infections. Terramycin or aureomycin (chlortetracycline hydrochloride) may likewise be used prophylactically.

SUMMARY

A case of an infant with cystic fibrosis of the pancreas with meconium ileus at birth has been presented. A successful operation at 23 hours of age was followed by a relatively mild postoperative course. The patient's sudden development of pneumonic infiltration with lobar atelectasis at six weeks of age responded well to antibiotic therapy.

The dietary and antibiotic management of this disease is briefly discussed.

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PREVENTION OF RECURRENCE OF PSORIASIS

An important tenet in the treatment of psoriasis which will help minimize the frequency of recurrences is to overtreat the involved areas. Continued topical treatment for four to six weeks after the apparent resolution of lesions will often prevent a recurrence in these locations. The frequency of recurrences at identical sites of former lesions, combined with recent work by the French school of dermatology showing that psoriatic lesions are often present after apparent clinical healing has taken place, implies that the clinical disappearance of the lesions is an inadequate guide for the discontinuance of therapy.

—LAWRENCE FRANK, M. D.
in *American Practitioner and Digest of Treatment*, p. 874, Nov. 1954

Rupture of the Esophagus by Compressed Carbon Dioxide

R. MAURICE HOOD, *Commander, MC, USN*

TRAUMATIC perforation of the esophagus may be produced by numerous types of external agents. Most frequently, endoscopic procedures and ingested foreign bodies are direct etiologic mechanisms. Penetrating and blast injuries are relatively infrequent even in wartime.

A case of rupture of the cervical esophagus by compressed carbon dioxide is reported here. A review of the literature revealed only three previously reported ruptures caused in a similar manner. In 1909, Petrén[1] reported a case of rupture of the midesophagus in a 27-year-old man who accidentally discharged a compressed air hose into his mouth. The man died 27 hours after injury. Kerr, Sloan, and O'Brien[2] reported the case of a 3-year-old child who bit an inflated inner tube, producing a blowout of the tube into his mouth. Rupture of the thoracic esophagus just above the diaphragm resulted in a left tension pneumothorax with extensive mediastinal and subcutaneous emphysema. The child recovered following drainage of the pleural space and gastrostomy. Borghero[3] reported a case of rupture of the thoracic esophagus by compressed methane gas discharged accidentally into the patient's mouth. Similarly caused injuries involving the rectum and sigmoid colon are well known, and it is surprising that esophageal injuries of this type are not more common.

The esophagus is a thin-walled, hollow viscus having no serosal covering. It is susceptible to perforation by rather minimal degrees of trauma. Kinsella, Morse, and Hertzog,[4] in an experimental study using fresh human cadavers, showed that rupture of the esophagus occurred at intraluminal pressures of 1.9 to 6.3 pounds per square inch. From their study it was also shown that the area of the esophagus just above the diaphragm was prone to rupture most easily. However, many other factors such as the level of intrapleural pressure, linear tension of the esophagus, rapidity of distention, and age of the patient would render the intraluminal pressure of rupture a variable and not a constant factor.

From U. S. Naval Hospital, Oakland, Calif.

CASE REPORT

The patient, a 22-year-old man, was engaged in loading carbon dioxide fire extinguishers into a truck when he accidentally depressed the release handle. The nozzle recoil caused the hose and nozzle to swing around violently, striking the man in the face. The full force of the expanding gas was directed at his nose and mouth. The pressure produced can only be guessed at. (The cylinder pressure in these extinguishers is normally from 700 to 800 pounds per square inch at 70°F.) He was dazed but not rendered unconscious. When seen by the medical officer 10 minutes after injury, he was bleeding profusely from the nose and mouth. The patient was given 15 mg of morphine sulfate, a nasal pack was inserted, and he was transferred to the hospital.

When examined in the emergency ward the patient was found to have an open, comminuted fracture of the nose with an extensive, soft-tissue bruise, and laceration over the left maxillary area. He was admitted to the eye, ear, nose, and throat service. Four hours after admission he began to complain of substernal pain radiating through to the back. An intern noted subcutaneous emphysema of the soft tissues of the neck, more marked on the left and extending over the anterior chest wall. Consultation from the thoracic surgery department was requested, and examination of the patient at that time revealed no evidence of pneumothorax. The subcutaneous emphysema, although present, was not extensive and was not progressing rapidly.

A roentgenogram of the chest showed mediastinal and cervical emphysema but no pneumothorax. After the patient swallowed lipiodol, a roentgenogram of the cervical and thoracic esophagus showed extensive extravasation of the medium into the tissues of the neck at the level of the lower border of the thyroid cartilage (fig. 1).

The patient was taken to the operating room immediately, and under general anesthesia the pharynx and upper esophagus were examined. A laceration beginning at the level of the upper margin of the epiglottis was seen extending down the posterolateral wall of the pharynx and to a point 5 cm below the cricopharyngeus muscle. An endotracheal tube was inserted and the skin prepared and draped. A 3-inch incision was made along the anterior border of the left sternomastoid muscle. The left inferior thyroid artery was ligated and divided, and the thyroid gland and trachea were retracted to the right. Extensive emphysema, tissue discoloration, and copious amounts of thin exudate having a faintly foul odor were encountered. The esophagus and lower pharynx were exposed and the previously described laceration visualized. At the lower end of the tear, a 2- by 2- by 0.5-cm piece of bone was recovered. This evidently was from the facial area and had been swallowed. Because of extensive edema and necrosis of the tissues involved in the laceration, no primary suture was attempted. Three Penrose drains were placed in the area of the laceration and the wound was packed open. Tracheostomy and gastrostomy were immediately

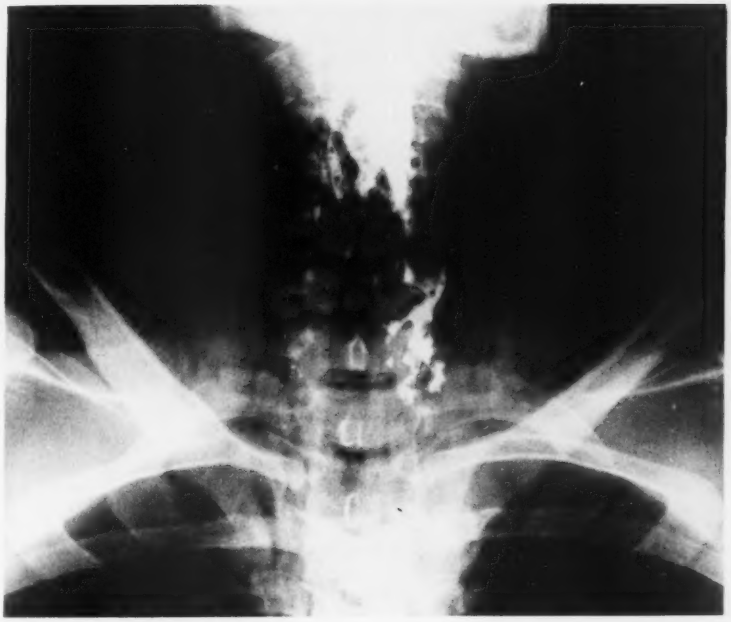

Figure 1. Roentgenogram made following a swallow of lipiodol which demonstrates interstitial emphysema, extravasation of the medium outside of the esophagus, and slight deviation of the trachea toward the right.

performed. Following this an oral surgeon reduced the open fractures of the nasal bone, left maxilla, and floor of the left orbit.

The patient's postoperative course was surprisingly smooth. Tracheostomy was abandoned on the fifth postoperative day. Feeding by gastrostomy was discontinued on the eighteenth day and oral feedings were resumed on the fifteenth. The salivary fistula closed spontaneously after 10 days. The drains were removed on the twelfth day. There was never any systemic or local evidence of infection. The patient was transferred to the eye, ear, nose, and throat service for further reconstructive surgery of the eye and facial bones. Five months after injury there was no evidence of stricture of the esophagus.

SUMMARY AND CONCLUSIONS

Injuries of the esophagus are frequently and easily overlooked in the early phase, and particularly is this true when the attention of the physician is drawn to other more obvious injuries. In a patient with rupture of the cervical esophagus by compressed carbon dioxide from a fire extinguisher, the presence of subcutaneous emphysema and an alert intern made the diagnosis possible within five hours of injury. Even at this time, tissue

necrosis, edema, and infection made direct repair impossible. Adequate drainage of the area through a cervical incision, tracheostomy, and gastrostomy resulted in control of infection and closure of the salivary fistula within 10 days without permanent disability.

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CURIOSITY

"Curiosity is one of the most important attributes of the mind, and is indispensable in any educational process. One sees it at work in the animal kindgom: in the fledgling bird's first attempt at flight from the nest, in a kitten's tentative exploration of an unknown object, in the inquisitive sniffling of a dog at almost any vertical object. Young children have this devine gift of curiosity to a marked degree. It is a tragedy that all too often it is discouraged by stupid pedagogy. Fortunately curiosity is so much a part of living and learning that it is never wholly lost, and with proper education can be made to grow again and thrive."

—JOHN H. GIBBON, Jr., M. D.
in *Annals of Surgery*
p. 322, Sept. 1955

A MESSAGE FROM THE A. M. A.

This is the second part of a report on the results of a continuing opinion survey of physicians released from active military service. The first part of this report appeared in last month's issue of the *U. S. Armed Forces Medical Journal*. This summary is based on 2,191 returns received in 1955 of a total of 3,651 questionnaires that were mailed out by the Council on National Defense of the American Medical Association.

Evaluation of Military Medical Training. The great majority of physicians filling out the questionnaire believed that all important features of medical military training had been satisfactorily covered. For the Air Force, 85 per cent were satisfied with the training, while 15 per cent were not satisfied; in the Army, 78 per cent were satisfied, and 22 per cent were not satisfied; in the Navy, 70 per cent were satisfied and 30 per cent were not. The basic orientation and indoctrination courses on military customs, administration, and regulations were most frequently listed as subjects in which too little training had been given.

Physicians' Evaluation of Assignment. A large majority of the physicians (approximately 75 per cent of the three services) indicated that they were properly assigned. Also, the number of physicians who were satisfied with their assignments was greater than the number not satisfied (although the majority was less decisive in this second case). In the Air Force 80 per cent indicated they were properly assigned, while in the Army it was 76 per cent, and in the Navy 69 per cent. Less than 1 per cent in the three services failed to answer this question. As to being satisfied with the assignment, again, the Air Force had the highest response of 71 per cent, followed by the Army with 69 per cent and the Navy with 67 per cent.

Physicians' Evaluation of Staffing Conditions. One of the questions requested an opinion as to staffing conditions of nurses, enlisted medical personnel, physicians, dentists, and others at those units where the physicians had served. The tabulation of this multiple-answer question indicates that, in the Army, replies of overstaffing totaled 660, understaffing 985, and adequate staff-

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From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor.*

ing 2,005. In the Navy, overstaffing totaled 400, understaffing 429, and adequate staffing 1,146. The Air Force tabulation revealed 459 replies of overstaffing, 892 of understaffing, and 1,324 of adequate staffing. By groups, physician overstaffing led the list in all three services, followed by dentists and then enlisted medical personnel in the Army and Air Force, while in the Navy, it was enlisted medical personnel with dentists in third place. The largest understaffed group in the Army and Air Force was nurses. In the Navy, dentists led nurses by a small per cent in understaffing. It is interesting to note that these results are almost identical with the report covering the last six months of 1954.[1]

Types of Patients Treated. One of the questions concerned the percentage of time devoted by physicians to military personnel, dependents of military personnel, and administrative duties, both at domestic and overseas stations. Approximately 50 per cent of the reporting physicians said that they devoted one half or more of their time to military personnel both at domestic and overseas stations. One half or more of the time allotted to dependents of military personnel at domestic stations was indicated by 36 per cent of the replying physicians, and at overseas stations by 23 per cent.

Types of Nonmilitary Medical Care. The type of medical care most frequently performed by medical officers for nonmilitary persons was outpatient care. Second in order of frequency for all three services was general medical and hospital care (although in the Navy, "other specialty services" tied for second place). For the Army, "other specialty services" was third in order, with obstetrics and gynecology the third in order for the Navy and Air Force.

Medical Duties Performed by Others. One of the questions was designed to obtain information with respect to provision of medical care for dependents by other than military physicians. The question was worded differently in the questionnaire form for the last six months of the period reported; consequently, separate tabulations had to be made for each half of the period. In the first six-month reporting period, over 50 per cent of the replying physicians believed that their duties could have been performed by other personnel. Of this group, over two thirds in each of the three services indicated possible transfer of their duties to civilian medical personnel. In the second six-month period, there was a spread of 12 to 18 per cent between services in which the physicians indicated that none of their duties could have been performed by civilian medical personnel. The great majority replied that some, most, or all of their duties could have been performed by someone else. About 40 per cent of this latter

group in each service believed that all domestic duties could have been performed by civilian medical personnel.

Physicians Who Would Voluntarily Remain in Service. In response to the question relative to military service beyond the obligated tour of duty, 923 physicians indicated they would not be willing to stay in military service for more than their two years of service under any circumstances. A total of 1,203 physicians indicated they would serve an additional period under certain conditions. As expected, total war led the list of "certain conditions" for all three services, followed by "increase in pay." Other conditions on this list were choice of stable location or duty assignment, opportunity to practice specialty, and promotion to higher rank.

REFERENCE

1. Message from the A. M. A. *U. S. Armed Forces M. J.* 6: 1691-1692, Nov. 1955.

Aero Medical Association Meeting

The Twenty-Eighth Annual Aero Medical Association Meeting will be held in Denver, Colo., 6, 7, and 8 May 1957, at the Shirley Savoy Hotel. Doctor Jan H. Tillisch, Rochester, Minn., President of the Association, will open the sessions at 9:00 a. m. on the first day, after which Doctor Alberto Hurtado will deliver the Louis H. Bauer lecture. Of considerable interest is the outstanding scientific program to be presented as multiple symposiums on the various disciplines allied to aviation medicine.

Among the prominent speakers scheduled are Colonel John P. Stapp, USAF (MC); Captain Norman L. Barr, MC, USN; Doctor Ross A. McFarland, of Harvard School of Public Health; and such noted leaders in the field of civilian aviation medicine as Doctor L. G. Lederer, Washington, D. C., and Doctor C. I. Barron, of Burbank, Calif.

Colonel Paul A. Campbell, USAF (MC), will conduct the symposium on space travel, in which such celebrated workers as Doctor Hubertus Strughold, Doctor Wernher von Braun, and Doctor Heinz Haber will participate.

The Association's annual banquet will be held on the evening of 8 May when the Lyster, Longacre, and Tuttle Awards will be made. Colonel Levi M. Browning, Surgeon of the U. S. Air Force Academy, is the general chairman of the 1957 meeting.

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NEW COMMANDING OFFICER AT LANDSTUHL ARMY MEDICAL CENTER

Brigadier General Clement F. St. John, MC, USA, has assumed command of the Landstuhl Army Medical Center, U. S. Army in Europe, succeeding Colonel Paul Hayes, MC, USA, who has returned to the United States. This marks the first time the Medical Center has had a Brigadier General in command. In addition to the organizations at Landstuhl, General St. John's new command includes the Army hospitals at Neubruecke, Bad Cannstatt, and Frankfurt, Germany, and five ambulance trains. General St. John was Deputy Surgeon, U. S. Army in Europe, from June 1955 until he assumed his present command.

General St. John has a long and illustrious military career in various staff and command assignments. He served in North Africa in 1942 with General Patton's Western Task Force, participated in the amphibious invasion at Casablanca, and took part in the Fifth Army's invasion of Salerno in September 1943. He was awarded the Legion of Merit, Medal for Valor (Italy), and Commander of Royal Order of the Crown (Italy).

OFFICERS CERTIFIED BY SPECIALTY BOARDS

Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*.

American Board of Pediatrics

Fred B. Becker, Comdr., USN
John E. Buess, Maj., USA
Robert B. Giffen, Jr., Lt. Col., USA
Thomas M. Holcomb, Maj., USAF
Francies Marshall, Comdr., USN
Edward J. Tomsovic, Maj., USA
Allen S. Weed, Maj., USAF

American Board of Psychiatry and Neurology

Psychiatry

Theodore M. Badgley, Maj., USA
Stuart L. Baker, Jr., Lt. Col., USA
Arnold W. Johnson, Jr., Maj., USA
Robert R. Keim, Jr., Maj., USA
Mortimer V. Kleinmann, Jr., Maj., USA
Laurence C. McGonagle, Maj., USA
John M. Murphy, Capt., USN
William J. Tiffany, Jr., Lt. Col., USA
Werner K. R. Welz, Lt. Comdr., USN
Paul G. Yessler, Lt. Col., USA

Neurology

Warren E. Porter, Maj., USA

American Board of Orthopaedic Surgery

George H. Chambers, Lt. Col., USAF
Coursen B. Conklin, Lt. Col., USA
James H. Dobyns, Maj., USAF
John A. Hennessen, Jr., Maj., USAF
Robert S. Lockwood, Lt. Col., USA
Robert W. Parvin, Lt. Col., USA
John W. Payne, Maj., USAF
Adolphe J. Schoepflin, Lt. Col., USA
James K. Tillotson, Lt. Col., USA

American Board of Dermatology and Syphilology

Henry L. Hines, Capt., USA
Robert Levine, Maj., USA

American Board of Radiology

Claude D. Baker, Maj., USAF
Nelson R. Blemly, Maj., USA
Edward T. Byrne, Capt., USN
Harry A. Claypool, Capt., USA
Neil E. Crow, Capt., USAF
Russell E. Graf, Lt. Col., USA
Walter F. Hansen, Comdr., USN
Henry J. Krawczyk, Lt. Col., USA
Philip J. W. Lee, Capt., USA
Gerald M. McDonnel, Lt. Col., USA
John L. Messersmith, Capt., USN
Warren A. Nafis, Maj., USAF
Marshall W. Olson, Lt., USN
Charles L. Randolph, Jr., Capt., USAF
Leonard H. Seitzman, Lt. Col., USA
Nicholas W. Van Leeuwen, Capt., USA
Charles C. Watts, Jr., Maj., USAF
Norman L. Yood, Capt., USN

American Board of Urology

Ferris E. Cook, Jr., Maj., USAF
Nicholas Mallis, Col., USA
William E. Morris, Comdr., USN

American Board of Obstetrics and Gynecology

Paul S. Andreson, Jr., Col., USA
Richard B. Austin, III, Lt. Col., USA
Byron L. Hawks, Capt., USN
Fred A. Heimstra, Col., USAF
Albert B. Lorwicz, Lt. Col., USA
Merill W. Rusher, Comdr., USN

American Board of Internal Medicine

Kenneth P. Bachman, Comdr., USN
Glenn D. Baird, Maj., USAF
Kevin G. Barry, Maj., USA
William R. Beisel, Maj., USA
James E. Cassidy, Capt., USAF
John S. Cowan, Capt., USN
Richard H. Ferguson, Maj., USAF
William H. Hall, Maj., USA
James H. Hammond, Col., USAF
James E. Hansen, Maj., USA
Donald M. Haskins, Maj., USAF
Joseph Hawkins, Maj., USA
Nestor M. Hensler, Maj., USAF
Jack T. Jones, Comdr., USN
Robert C. Jones, Maj., USA
Wilbur L. Kenoyer, Maj., USAF
Stephen R. Mills, Jr., Lt. Comdr., USN
Stanley Newman, Maj., USA
Nicholas G. Pottiglieri, Maj., USA
Joel H. Richert, Maj., USA
Thomas L. Robbins, Lt. Col., USA
John E. Roberts, Lt. Col., USA
Milton F. Rubini, Maj., USA
Norman M. Scott, Jr., Lt. Col., USA
Virgil E. Seibert, Comdr., USN
Vernon M. Smith, Maj., USA
Robert J. Solomon, Capt., USAF
Francis G. Soule, Jr., Capt., USN
Robert B. Stonehill, Maj., USAF

American Board of Pathology

Robert M. Dimmette, Comdr., USN
Edward J. Fadell, Lt. Col., USA
Robert C. Hastedt, Lt. Comdr., USN
Joseph F. Hetzger, Maj., USA
Robert Kellenberger, Col., USA
Donald J. MacPherson, Lt. Comdr., USN
Robert W. Morrissey, Maj., USAF
Donald J. Winslow, Lt. Col., USA

American Board of Ophthalmology

Ellis M. Altfather, Col., USA
Oran W. Chenault, Capt., USN
Shirley A. Fuhring, Capt., USN
Joel N. McNair., Lt. Col., USA
Irving Wilker, Maj., USA

American Board of Otolaryngology

James L. Sheehy, Maj., USA

American Board of Surgery

William W. Bindeman, Maj., USA
Joseph Castagno, Lt. Col., USA
Phil D. Cronemeiller, Comdr., USN
Donald L. Custis, Comdr., USN
Donald W. Edwards, Lt. Comdr., USN
David D. Greene, Capt., USN
Harry J. Grossman, Lt. Col., USA
Harold F. Hamit, Lt. Col., USA
Alan R. Hopeman, Maj., USA
Edward J. Jahnke, Jr., Maj., USA
Robe B. Jamieson, Jr., Capt., USN
Jack B. Jay, Maj., USAF
William G. Krech, Comdr., USN
Irving R. Lyman, Col., USA
George W. Martin, Lt. Col., USA
Roscoe E. Mason, Maj., USA
William H. Moncrief, Jr., Lt. Col., USA
Alvin S. Natanson, Capt., USAF
Kenwyn G. Nelson, Capt., USA
Theodore H. Nicholas, Maj., USA
John C. Patterson, Lt. Col., USA
Paul K. Perkins, Capt., USN
Lindsay R. Riddle, Capt., USN
George F. Rumer, Lt. Col., USA
Lowell R. Steel, Lt. Col., USA
Edgar E. Thomas, Lt. Comdr., USN
Joseph J. Timms, Capt., USN
Stephen H. Tolins, Capt., USN
Dean F. Winn, Jr., Maj., USA

American Board of Anesthesiology

Timothy G. Barila, Maj., USA
Philip C. Canney, Maj., USA
Judah L. Heller, Capt., USAF

American Board of Plastic Surgery

John K. Quinlivan, Capt., USAF

American Board of Neurological Surgery

John B. Moyar, Maj., USA

American Board of Physical Medicine and Rehabilitation

Robert J. Gosling, Maj., USA
Arthur E. Grant, Maj., USA
James A. Shafer, Maj., USA
Elias M. Throne, Maj., USA
Frederick Vultee, Jr., Maj., USA

American Board of Preventive Medicine

Public Health

John R. Hall, Jr., Col., USA
Max B. McQueen, Col., USAF
Jack W. Millar, Comdr., USN
Cecil S. Mollahan, Col., USA
Hugh W. Randel, Maj., USAF
Howard K. Sessions, Capt., USN
Stefano Vivona, Maj., USA

Aviation Medicine

Louis B. Arnoldi, Col., USAF
Murray W. Ballenger, Capt., USN
Ferdinand Barnum, Maj., USAF
Lynn S. Beals, Jr., Capt., USN
Bruce H. Bennett, Col., USAF
Jack Bollerud, Col., USAF
Franklin L. Bowling, Maj., USAF
John E. Boysen, Col., USAF
Thomas A. Collins, Lt. Col., USAF
John R. Copenhaver, Brig. Gen., USAF
Thomas H. Crouch, Col., USAF
James M. Davis, Lt. Col., USAF
Paul V. Davis, Col., USAF
William K. Douglas, Maj., USAF
James G. Espey, Jr., Col., USAF
George K. Fair, Col., USAF
Donald L. Ferris, Col., USAF
F. Witney Hall, Col., USAF
Henry C. Hunley, Jr., Capt., USN
Aubrey L. Jennings, Col., USAF
Andres I. Karstens, Col., USAF
William T. Kelley, Lt. Col., USAF
Wilbur E. Kellum, Capt., USN
Paul H. Lance, Col., USAF
Harold E. List, Capt., USN
Stanley Lutz, Jr., Maj., USAF
Charles B. Marshall, Jr., Maj., USAF
Earl Maxwell, Brig. Gen., USAF
Charles K. Morris, Col., USAF
Harold A. Myers, Col., USAF
Sam E. Neely, Maj., USAF
Herman S. Parish, Jr., Maj., USAF
Philip B. Phillips, Capt., USN
Clifford P. Phoebus, Capt., USN
Joseph M. Quashnock, Maj., USAF
Burt Rowen, Lt. Col., USAF
Hartwin A. Schulze, Col., USAF
Vance E. Senter, Capt., USN
Samuel O. Smelsey, Lt. Col., USAF
John T. Smith, Capt., USN
Larry A. Smith, Col., USAF
William M. Snowden, Capt., USN
Ralph E. Switzer, Col., USAF
Charles H. Talbot, Lt. Col., USAF
William R. Turner, Maj., USAF
Eugene E. Van Vranken, Maj., USAF
Frank B. Voris, Capt., USN
Henry C. Wallace, Col., USAF
Stanley C. White, Maj., USAF
Hayden Withers, Col., USAF

Founders Group in Occupational Medicine

Allan S. Chrisman, Capt., USN
Gilbert H. Collings, Maj., USA
Edward J. Dehne, Lt. Col., USA
John R. Hall, Jr., Col., USA
Bartholomew W. Hogan, Rear Adm., USN
Moffitt K. Holler, Capt., USN
Lloyd B. Shone, Capt., USN
Walter Welham, Capt., USN

Board of Thoracic Surgery

(A Subsidiary Board of the American Board of Surgery)

Francis E. Foley, Lt. Col., USAF Edward J. Jahnke, Jr., Maj., USA

The James Stevens Simmons Memorial Professorship

The distinguished career of the late Brigadier General James Stevens Simmons, MC, USA (Retired), is well known to readers of this *Journal.* Subsequent to his retirement in 1946 after 30 years of outstanding service in the Medical Corps of the Army, General Simmons achieved additional fame for dynamic leadership in the fields of public health and preventive medicine during an additional eight years as Dean of the Harvard School of Public Health. In his memory, a group of friends have given $150,000 toward an endowed professorship at the School he directed, and invite other friends and colleagues to contribute to the fund in order that the professorship may be activated as soon as possible. Gifts to date are sufficient to guarantee the permanence of the professorship. When accumulated income on the endowment and additional gifts have brought the fund to $400,000, a James Stevens Simmons Professor will be appointed.

George Cheever Shattuck is Chairman of the Committee of Sponsors, which includes Stanhope Bayne-Jones, C. Francis Beatty, Robert F. Bradford, Rolla E. Dyer, Martha M. Eliot, George Gund, Silas B. Hays, Mary W. Lasker, John P. Marquand, Philip R. Mather, Frederick M. Mayer, Curt H. Reisinger, Henry L. Shattuck, and Tom F. Whayne. Contributions to the memorial professorship fund, made payable to Harvard University, may be sent directly to any of the Committee or to the Harvard School of Public Health, 55 Shattuck Street, Boston 15, Mass.

UNUSUAL MILITARY MEDICINE COURSE

The starting date for the fifth class of Military Medicine and Allied Sciences (Course 8-0-38) presented annually by the Walter Reed Army Institute of Research will be 3 September 1957. The purpose of the course is to develop highly qualified professional leadership at medical research, teaching, and treatment centers.

Fifteen medical officers who have completed formal residency training in a specialty will be selected for the nine-month course, said to have no counterpart in the United States. Quotas have been offered to the Navy and Air Force.

No attempt will be made to cover clinical subjects in a textbook fashion or to review general textbook data. Basic mechanisms are to be studied, recent advances in the sciences examined, and correlation made between the various areas of science.

The students will be guided into a broad pattern of many subjects by a resident and visiting faculty of Army, Navy, Public Health, and other governmental authorities, and by lecturers from many of America's leading universities and from Europe. Considerable time will be spent on the medical aspects of radiation, radioisotopes, nuclear warfare, treatment of mass casualties, chemical and biological warfare agents, and certain global epidemiological concepts of particular importance to military professional personnel. Approximately half of the time in the course will be devoted to individual research projects which afford the students an opportunity to apply theoretical material to a practical purpose. A thesis must be completed and accepted before graduation on 20 June 1958.

Proposed legislation making it possible for such graduates to be awarded a Master's degree in Science by the Walter Reed Army Institute of Research is being processed under the Federal policy governing the granting of academic degrees by Federal institutions.

A highlight of the class commencement is the awarding of the Hoff Medal, established to commemorate Colonel A. H. Hoff, and given to the student attaining the highest class proficiency.

A brochure outlining the prerequisites for attending this course has been distributed to the surgeons of all major commands, to medical treatment centers, and to the offices of the Surgeons General of the Navy and Air Force. Individuals desiring a brochure should make their request to the Commandant, Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington 12, D. C.

Individuals desiring to attend the course may submit an application in letter form, through appropriate military channels, to the Surgeon General, Department of the Army, Washington 25, D. C. Attn: Personnel Division.

Army Medical Officer Honored

Colonel William L. Thompson, MC, USA (Ret.), was honored on 9 February at a meeting of the annual combined session of the American College of Radiology and the Association of Teachers of Radiology at the Drake Hotel, Chicago, Ill. He was presented a Special Award of Honor by the Board of Chancellors of the American College of Radiology for his outstanding achievement as Chief of the Registry of Radiologic Pathology at the Armed Forces Institute of Pathology. The award read in part:

> Colonel Thompson exemplifies the highest attainments of judicious, persevering effort motivating the outstanding medical scientist. His contributions to radiological education and training are invaluable; his efforts on behalf of our specialty are beyond recompense; the gratitude of his colleagues and friends is without qualification. We all are in his debt.

Colonel Thompson has been with the Armed Forces Institute of Pathology since his retirement in June 1950 as Chief of the Radiologic Pathology Section of the American Registry of Pathology.

NATIONAL INDUSTRIAL HEALTH CONFERENCE

The Twelfth National Industrial Health Conference will be held at Kiel Auditorium, St. Louis, Mo., 20-26 April 1957. These Conferences annually bring together the five organizations whose members are responsible for maintaining the health of the nation's industrial workers: the Industrial Medical Association; the American Industrial Hygiene Association; the American Association of Industrial Nurses, the American Conference of Governmental Industrial Hygienists; and the American Association of Industrial Dentists.

Some 200 of the country's leading specialists and experts in the complexities and technicalities of preventive medicine and hygiene in industry will present the latest findings and developments relating to: occupational diseases and injuries; nonoccupational conditions in employment; mental health; psychologic testing; rehabilitation and physical therapy; geriatrics and retirement; problem drinking; noise; air pollution; toxicology; radiation; administrative medicine; cancer as an industrial health problem; the relation of the general practitioner to industrial work; dental health; the medical witness in the courtroom; death patterns in industry; respiratory protection; and engineering and analytical chemistry as related to industrial health, together with numerous other subjects of present-day medical and scientific importance.

More than 100 technical exhibits will be displayed throughout the Conference. The exhibits are designed to acquaint the industrial physician with all the latest developments in products and equipment that will aid him in his work.

The formal sessions—more than 40 in number—include symposiums and panel discussions on subjects of timely interest; special meetings of the various groups; and conferences of special committees. In addition, there will be meetings of company physicians—steel, oil, electric, auto—starting with the all-day conference of General Motors physicians on Monday, 22 April.

Feature of the formal opening session will be the C. O. Sappington Memorial Lecture, by Frank Curtis, Vice-President, Monsanto Chemical Company, and Past-President, American Institute of Chemical Engineers. The Donald E. Cummings Memorial Lecture will be given by H. H. Schrenk, Ph. D., Industrial Hygiene Foundation.

The annual Industrial Health Conference provides an unexcelled opportunity for postgraduate study of new ways to improve and preserve the health of the American worker. Its purpose is the continuing

enlightenment of all who are interested in the broad and important field of industrial health—industrial physicians and surgeons, industrial hygienists, industrial nurses, industrial dentists, and representatives of management, together with physicians in general practice who have industrial affiliations. All are invited.

Jerome W. Schilling, M. D., Medical Director, Pacific Telephone and Telegraph Company, Los Angeles, and President-Elect of the Industrial Medical Association, is General Chairman of the Conference. Richard A. Sutter, M. D., St. Louis, is Deputy General Chairman. The complete program may be obtained by writing E. C. Holmblad, M. D., Managing Director, Industrial Medical Association, 28 East Jackson Boulevard, Chicago, 4, Ill.

DEATH

COHEN, Sidney Hillel, Commander, MC, USN; of Brooklyn, N. Y.; stationed on U. S. S. *Saratoga* (CVA-60); graduated in 1943 from University of Rochester School of Medicine and Dentistry; appointed a Lieutenant (junior grade) in the Naval Reserve 3 December 1943 and ordered to active duty 15 October 1944; released to inactive duty 28 July 1948, recalled to active duty at his own request 1 January 1950 and transferred to the regular Navy on 5 July 1950; died 1 February 1957, age 36, at the U. S. Naval Hospital, St. Albans, Long Island, N. Y., of myocardial infarction.

DENTAL ASSOCIATION OFFICIAL VISITS AIR FORCE BASE

Dr. William R. Alstadt, President-Elect of the American Dental Association (center of photograph), visited Little Rock Air Force Base, Ark., on 29 January 1957. He was accompanied by Dr. Ernest D. Jernigan, President of the Central District Dental Society, and Dr. Fred R. Bollen, Secretary of the Society.

All dentists stationed at the Little Rock Air Force Base are members of the American Dental Association and take an active interest in district and state association affairs.

CORRESPONDENCE

The article by Lieutenant Colonel John W. Burkett, MC, USA, on "Clinical Recognition of Early and Insidious Schizophrenia," which was published on pages 1759 to 1763 of the December 1956 issue of this Journal, *appears to have aroused considerable interest. It was abstracted on page 54 of the 31 December 1956 issue of* Newsweek, *and also evoked a letter to the editor that we consider to be a well-thought-out extension of Colonel Burkett's position—Editor.*

To the Editor:—Dr. Burkett's article has not failed to leave a definite imprint on the thinking and feeling of the medical staff at these writers' duty station, a major naval hospital called upon to evaluate and treat a good number of schizophrenics. Not only psychiatrists but also general medical officers have a frequent occasion to encounter similar problems, and it is their concern with the matter that led these writers to give a brief answer to the ideas expressed in the article.

Quite judiciously Dr. Burkett pointed out that a variety of symptoms can be the early signs of schizophrenia. He also stated explicitly in the summary that none of these are by themselves pathognomonic for the disease; yet the emphasis placed on them has aroused understandable concern in many medical officers, who daily see these symptoms and at once come to suspect a deep-seated psychosis instead of a mild neurotic symptom that should be handled supportively. It is a not unusual experience on neuropsychiatric services of hospitals like this one to receive intransfer patients who have already been given diagnoses of schizophrenia when the problems in reality are the consequence of character disorders of various kinds. Under appropriate management they typically quiet down within a day or two, and this opens the way for further treatment and/or judicious disposition.

In order to clarify the issue of early schizophrenia and its recognition, a few considerations seem to be appropriate. In present-day thinking, schizophrenia is generally seen as a malignant disorder of thinking, the main feature of which is a disintegration of the personality structure. The process may progress steadily, may remain stationary, or may reverse itself with more or less full recovery. Its main characteristic is the *depth* of the disturbance and not its manifestations. Bleuler's* distinction between the primary and secondary symptoms, although now partially superseded by newer research, makes this particular point very clear. The psychoanalytically oriented psychiatrists, moreover, have shown that the problems with which schizophrenic patients

*Bleuler, E. P.: Textbook of Psychiatry. Authorized English edition by A. A. Brill. Dover Publications, Inc., New York, N. Y., 1951.

grapple are basically the same as those of the neurotics and of mankind in general. It is only their way of dealing with them which reveals the actual breakdown of the personality structure. The so-called defense mechanisms, or the ways of dealing with problems, are many and varied, and it is well accepted that normal people, neurotics, and schizophrenics can use the same kinds. Unfortunately, therefore, we cannot classify certain kinds of reaction patterns simply as schizophrenic or neurotic.

There is, however, a difference in *obviousness,* which can serve as a guidepost for any examiner who is called upon to evaluate a man's mental disease in a short and practicable time. Frank delusions, as everyone knows, are likely to be schizophrenic, in the absence of toxic or organic findings. Distortion of reality and projection often occur in psychotics in an obvious form. Yet they can occur in neurotics also, although sometimes difficult to discover. *Anxiety* in various forms, such as "shaking spells," apprehension, or manifest physical signs, is also a fairly common human response under certain stresses, and the task of the physician is to evaluate its depth and its disruptive threat. Deep, free-floating anxiety, that does not subside when the secondary gains of a neurotic are realized, will strike anyone as more serious than the bidding of an immature personality to be freed of a stressful situation. The apparent absence of immediate secondary gain will often be a signpost toward a more malignant diagnosis. Schizophrenics often request return to duty in the face of obvious inadequacies in their functioning, whereas the more frequent character disorders will invariably seek discharge from service, in spite of their capacity for apparently satisfactory functioning.

It is not the purpose to establish solid and specific criteria for the diagnosis of early schizophrenia. This, in the writers' opinion, cannot be done at the present time when competent psychiatrists still hold many contradictory opinions. For the service medical officer required to assess a patient's mental symptoms quickly and accurately, certain main features must be kept foremost in his diagnostic thinking. They seem to us to be (1) the depth of the personality disintegration, often correctly assessed by the patient's immediate associates; (2) the conspicuous pathology of certain defense mechanisms like distortion of reality and projection; and (3) a primitive type of anxiety which is unaffected and unalleviated by secondary gains and often appears incomprehensible or inappropriate to the casual examiner.

The author has, however, aroused considerable alarm among non-psychiatric medical officers by emphasis upon the nonspecific signs and symptoms of incipient (not borderline) psychosis. These general service medical officers are now naturally but unjustifiably doubtful of their ability to assess the importance of anxiety, hypochondriasis, conversion symptoms, and alcoholism. Since it is probably more damaging to the patient to be labeled psychotic in error than to defer a firm diagnosis, even though appropriate treatment may be thereby postponed, it is probably most prudent to continue leaving the diagnosis of incipient

psychoses and borderline states to the experienced psychiatrists. While early recognition and treatment are surely desirable in all branches of medicine, this problem has little if any emergency importance such as found in acute surgical crises.

Dr. Burkett has performed a useful service in stirring interest in and discussion of an important aspect of psychiatry.

LYNN S. BEALS, Jr., *Captain, MC, USN*
and
JACOB CHRIST, *Lieutenant, MC, USNR*
U. S. Naval Hospital, Chelsea 50, Mass.

Air Force Nurse Awarded Legion of Merit

By direction of the President, Captain Antoinette M. K. Fears, USAF (NC), has been awarded the Legion of Merit for exceptionally meritorious conduct in the performance of outstanding service, in the Caribbean Air Command during the period 10 August 1954 to 18 July 1956.

Captain Fears, in 16 emergency or rescue missions with the U. S. Air Force Air-Sea Rescue Service, rendered distinctive and professional services, displaying disregard for her own personal safety in the face of very hazardous conditions. On several occasions her outstanding performance was directly responsible for the saving of a life. Captain Fears has reflected a great credit upon herself and the Medical Service of the United States Air Force.

Reviews of Recent Books

A TEXTBOOK OF PATHOLOGY, by *E. T. Bell,* M. D. Contributors: *B. J. Clawson,* M. D., and *J. S. McCartney,* M. D. 8th edition. 1,028 pages; 545 illustrations and 5 plates in color. Lea & Febiger, Philadelphia, Pa., 1956. Price $14.50.

This new edition follows the same pattern of organization and development of general and systemic pathology as did the seventh edition. There have been alterations and additions reflecting recent advances and developments, particularly in the hematologic and metabolic sections. References to recent contributions to the literature are made, with a large proportion dating back to 15 to 20 years ago.

The text is well organized and is clearly and comprehensively written. Its numerous illustrative photomicrographs, drawings, and plates are well chosen. Its presentation is consistent with the needs of the medical student, the resident, and the clinician desiring a concise review of the basic principles of pathology with a minimal emphasis on problematical and controversial issues.

—NELSON S. IREY, Lt. Col., MC, USA

ETIOLOGIC FACTORS IN RENAL LITHIASIS, compiled and edited by *Arthur J. Butt,* M. D., F. A. C. S. 400 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $12.50.

This is an excellent and timely review of the factors in the etiology of urinary calculi. Dr. Butt, while acting primarily as editor, has also contributed certain chapters from his vast experience in this field. The remaining chapters have been prepared by 20 contributors prominent in the field of urology and urologic research.

The subject is one of the oldest in the field of medicine. Although the book does not say the final word concerning the etiology of calculi, it does assemble a mass of information that cannot be found elsewhere in one volume. At the close of each chapter, many references are made to the literature from which the opinions are formed. The contributors frankly present divergent views, so that one can form his own opinion regarding the etiologic factors of stone formation.

The book goes into the newer uses of the electron microscope and the flame photometer with reference to urinary colloids, and one chapter is devoted to the analysis of stones. It covers stasis, retention, metabolic disturbances, diet, and evironment in relation to stone formation. It leaves open the possibility that there still exists a common denominator for all stone formation, which to date has not been found.

The editor brings out the fine orginal work which he has done with reference to hyaluronidase and the consequent release of hyaluronic acid.

This is an excellent work for all interested in research on the subject of renal lithiasis, particularly for those desiring to study the causes. It should serve as a springboard for further studies in the field.

—*JOHN A. SCHINDLER, Col., USAF (MC)*

NEUROLOGICAL NURSING, A Practical Guide, by *John Marshall,* M. D., M. R. C. P., M. R. C. P. Ed., D. P. M. 166 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $3.75.

This textbook is intended for nurses, doctors, physiotherapists, and others who are concerned with the general management of patients suffering from neurologic disease. The author points out that the nurse has an important part to play in the wider therapeutic approach to neurologic diseases and a responsibility for educating the patient in the management of his disability.

This small 166-page textbook does not attempt to deal with detailed accounts of the anatomy and physiology of the nervous system or with extensive descriptions as signs and symptoms of neurologic disease. It is entirely concerned with the practical problems encountered in the care of these patients. Clear and concise instructions in the management of neurologic problems, including specialized technics, are outlined for the nurse. The book is well illustrated with black and white photographs and excellent sketches demonstrating proper positioning of the patient. There is a particularly noteworthy chapter on the psychologic approach to the patient with neurologic disease. This text is strongly recommended for both student and graduate nurses.

—*VERA E. THOMPSON, Lt. Comdr., NC, USN*

CONCISE ANATOMY, by *Linden F. Edwards,* Ph. D. 2d edition. 502 pages; illustrated. McGraw-Hill Book Co., Inc., New York, N. Y., 1956. Price $6.50.

In 502 pages the author has covered the field of human anatomy in a surprisingly detailed manner. As one would expect from the title, the book lacks the greater detail and reference value of a *Gray's Anatomy* or of other standard texts. Following a short introduction, the book is divided into six parts dealing with general anatomy, the superior extremity, the inferior extremity, the head, the neck and trunk, and the splanchnic structures. At the end of each chapter there is a brief discussion of applied anatomy. Descriptions of anomalies and the relationships of the various structures are brief or omitted.

The text is written in a clear, concise, and readable manner. Except for a colored plate of normal blood cells, the illustrations are all black and white; most are from *Morris' Human Anatomy.* The illustrations are

generally adequate, but a few could be improved by color. The printing and binding are well done. Because it lacks many details found in the larger texts, the book is not recommended for medical students or as a reference work. However, nurses and students of the biological sciences generally will find this a useful text.

—*HUGH B. HOEFFLER, Lt. Col., MC, USA*

PEDIATRICS, edited by *Donald Paterson*, M. D., and *John Ferguson McCreary*, M. D., with 36 contributing authors. 654 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1956. Price $14.

The work of a number of Canadian authors, this 654-page textbook is easily read and well indexed, and should appeal first to the general practitioners of medicine. There are numerous illustrations of good quality and a complete bibliography. Emphasis is placed on diagnosis and treatment of the commoner conditions, with rarities being mentioned but not elaborated on. The section on poisoning could be more complete and that on fluid and electrolyte more detailed. Problems of the newborn, ophthalmic and orthopedic, receive suitable attention in the text, with many ophthalmic illustrations which are excellent.

Considering diseases due to prenatal factors, an excellent table is provided, listing the clinical disease, approximate incidence, and pedigree pattern. The commoner problems of the alimentary tract are well presented, together with excellent roentgenograms. A thoughtful discussion of the respiratory system is given, with many good roentgenograms of the major problems. Allergies, asthma, allergic rhinitis, and eczema receive good coverage. The anemias of infancy and childhood are discussed well, and also presented in tabular form.

Diseases of the nervous system, mental retardation, and behavior disorders receive practical consideration in this volume while at the end of the book there are tables of drug dosage, blood plasma and serum values, liver and kidney function tests, and various suggested diets. The book is well written, orderly, and practical.

—*MILTON KURZROK, Capt., MC, USN*

PROGRESS IN RADIOBIOLOGY, Proceedings of the Fourth International Conference on Radiobiology held in Cambridge on 14th to 17th August 1955, edited by *Joseph S. Mitchell, Barbara E. Holmes*, and *Cyril L. Smith*. 557 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $12.75.

This volume is the record of the Fourth International Conference on Radiobiology, convened at Cambridge, England, in August 1955. The authors have attempted to present a coherent, readable picture of the Conference and have reprinted a good deal of discussion by the delegates after each paper. The inclusion of this detailed discussion is unusual in formal publications, but, for this reviewer, added immeasurably to the value of the papers and was well worth the editorial effort.

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The data presented is almost entirely new and includes the contemporary work of over one hundred radiobiologists representing 20 countries. Subject material encompasses a significant portion of the field including biochemical and enzymatic applications, as well as effects on the total subject from bacteria to man. Special sections are devoted to genetics, carcinogenesis, protection, and human data. Throughout the book, emphasis is on the relationship of radiobiology to the field of clinical medicine, and, where appropriate, practical extensions of laboratory work are suggested or recommended. Some of these suggestions are certainly tentative, but it is refreshing to see the development of a closer relationship between the biologist and the clinician.

Although this book is of primary value to the radiobiologist, it is felt that the radiologist, as well as other physicians interested in the effects of radiation on man, will find many of the fundamental principles discussed clearly and concisely and will gain an appreciation of some of the current problems and controversies.

—*JAMES B. HARTGERING, Lt. Col., MC, USA*

DIABETES MELLITUS, Handbook for Physicians, by *Howard F. Root,* M.D., Sc.D., F.A.C.P., and *Priscilla White,* M.D., Sc.D., F.A.C.P. 346 pages. Landsberger Medical Books, Inc., New York, N.Y., 1956. Distributed solely by The Blakiston Division of the McGraw-Hill Book Co., Inc., New York, N. Y. Price $7.

This book is meant to be a handbook for the daily use of physicians and accomplishes its object very well. It succeeds in giving a good picture of all the usual findings in the disease as well as giving a brief but good account of many complications. Since it is intended to be practical and immediately useful it is somewhat didactic, but mentions alternate procedures, usually giving the authors' arguments against them.

The authors point out the value of determining the postprandial blood sugar as against the standard fasting test. They call attention to the need for complete examination of the patient who may have a variety of symptoms caused by diabetes. The book points out the need of repeated follow-up and observation. Diet is handled in a short, sensible chapter. The early use of insulin in the disease is urged on the basis that the patient will appreciate that his disease is serious and requires constant attention.

There is mention of the new insulin-saving sulfonamide derivatives, the usefulness of which is still being investigated. Especially interesting were the observations on diabetic neuropathy. The relationship of infections, anesthesia, and surgery to insulin resistance is discussed. The danger of nephropathy in long-term diabetics is brought out, as well as the handling of diabetics facing operation.

There is ample space given to the endocrine method of treating pregnant diabetic women, with statistics of the excellent results obtained by the authors. This method has not been always successful in the hands of others.

The authors have followed a great number of diabetic children for many years, and the inevitability of vascular and kidney damage is obvious. The authors are optimistic that future discoveries may improve this picture. This is an impressive and useful little book which any physician would enjoy.—*JAMES L. TOBIN, Col., USAF (MC)*

HEAD INJURIES AND THEIR MANAGEMENT, by *Francis Asbury Echlin,* M. D., C. M., M. Sc., Med. Sc. D., F. A. C. S. 127 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1956. Price $3.

This small handbook briefly describes the essentials in diagnosis and treatment of head injuries, making this knowledge easily accessible and of practical value to interns, residents, and surgeons.

Sections on the mechanisms of head and brain injury; nonsurgical lesions of the brain; and surgical conditions such as lesions of the scalp, skull fractures, hematomas, and penetrating wounds of the brain; surgical complications of head injuries, such as wound infection, skull defects, and posttraumatic epilepsy give concise but little more than introductory discussions of the problems. The diagnostic procedures of encephalography and angiography are little more than mentioned.

Even as a guide the book is inadequate and will not fit the needs of a physician on whom rests the responsibility of diagnosing and treating head injuries.—*FRANKLIN M. ROBERTS, Lt., MC, USNR*

SIMPLIFIED NURSING, by *Florence Dakin,* R. N., and *Ella M. Thompson,* B. S., R. N., with the assistance of *Margaret LeBaron,* R. N. 6th edition. 800 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1956. Price $4.50.

This book has been revised and brought up to date to keep pace with new developments in medical care and the changing concepts in the training and the utilization of practical nurses in the home and the hospital.

The format is essentially the same as in earlier editions but much new material has been added. More information has been included concerning the structure and functions of the body. Since the development of many new drugs affecting the treatment and care of patients, the section on drugs has been considerably increased.

Other material revised in this comprehensive text includes the status of the practical nurse as a member of the health team in the hospital and the community. Throughout the book emphasis is placed on the care of the patient as a person—a human being who has personal problems and emotional reactions—and on the need for the practical nursing student to make personal adjustments and establish good report.

In the presentation of nursing procedures the two-column format, which includes "Suggested Procedure" and "Key Points," has been

retained. The whole text is easily read and very understandable, making it particularly valuable to the student practical nurse. There is an excellent, detailed index and a list of references for further study.

This book is highly recommended as a useful guide for the instructor of auxiliary nursing personnel as well as a text for the practical nursing student.—*AILEEN E. BRIMMER, Maj., USAF (NC)*

PRACTICAL PEDIATRIC DERMATOLOGY, by *Morris Leider,* M. D. 433 pages; 280 photographs and 13 drawings. The C. V. Mosby Co., St. Louis, Mo., 1956. Price $10.50.

This book, a first edition, will be most appreciated by the busy pediatrician and general practitioner. Although embracing very little that is new or original in the management of skin diseases in children, the frequent use of charts and tables in presenting the material will be a timesaver for many. It is not intended to replace the more encyclopedic works for the specialist, but is written with practical purposes foremost in mind. Even so the author admits encountering difficulty in deciding what subject material to omit from the book.

The final chapter attempts to cover a miscellany of uncommon dermatoses of infants and children. In this one chapter over one hundred dermatoses are briefly described.

The book is arranged in 14 chapters, generally grouped according to broad etiology. It is completed in 433 pages. The photographs are good.—*CLAUDE B. WHITE, Col., USAF (MC)*

THE YEAR BOOK OF PEDIATRICS (1956-1957 Year Book Series), edited by *Sydney S. Gellis,* M. D. 480 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1956. Price $6.75.

This book is a representative review of the American and foreign pediatric literature from June 1955 through May 1956. This volume is similar to and compares favorably with previous and companion volumes. The abstracts are conveniently arranged according to the body systems in 18 well-indexed sections. The editor has done very well in preparing and compiling 335 abstracts of the best and most representative papers in the current pediatric literature. The volume is suitable as a quick and ready reference and as a guide to determine the trend in recent pediatric treatment and diagnostic methods.

Dr. Gellis is to be congratulated for accomplishing the Herculean task of abstracting and compiling pertinent pediatric literature in such a complete, convenient, and well-organized manner. One of the most valuable features is the editorial comment following most of the more important papers presented. The value of this volume is greatly enhanced by the interspersing of comments by many guest authorities on the more controversial subjects.

This book is recommended for all students and physicians interested in the most up-to-date information in the field of pediatrics. While not a reference book, it presents much practical information in a concise and readily accessible form. —*WILLIAM I. NEIKIRK, Comdr., MC, USN*

A GUIDE FOR PSYCHIATRIC AIDES, by *Charlotte R. Rodeman,* R. N., M. Ed. 234 pages. The Macmillan Co., New York, N. Y., 1956.

This book is of great value to a nursing instructor who is responsible for the training of nonprofessional personnel assigned to the care of psychiatric patients. It also provides an excellent guide for the individual worker. The text is well written in clear, understandable terms which can easily be grasped by the beginner.

The author has continually emphasized the attitudes and relationships of the attendant in respect to the nursing care to be administered. The material is divided into 11 chapters followed by a glossary, bibliography, and index.

Since tranquilizing drugs are now being used effectively in the treatment of psychiatric patients, the value of this book as a guide might be increased by adding another chapter on nursing care in this area. Despite this, however, the book is excellent and should be well received.

—*ELEANOR WELCH, Maj., USAF (NC)*

CLINICAL ENDODONTICS, A Manual of Scientific Endodontics, by *Ralph Frederick Sommer,* D. D. S., M. S., F. A. C. D., F. A. A. O. R., *F. Darl Ostrander,* A. B., D. D. S., M. S., F. A. C. D., and *Mary C. Crowley,* A. B., M. S. P. H. 514 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1956. Price $10.50.

In the preface, the authors state that it is their intention to approach the subject of endodontics by integrating the preclinical demonstrations with the actual clinical practice. It is the reviewer's belief that this is accomplished in an extremely satisfactory manner.

The book is divided into 22 chapters which cover the subject, from a history of root canal therapy to a brief discussion of the principles of prescription writing. Not only does this book discuss the technics of root canal management, but also the histology and histopathology of the dental pulp and periapex.

Line drawings, x-rays, and photographs are well related to adequately develop each new subject. The x-rays are particularly worthy of note; they are well chosen, clearly reproduced, and are provided with brief and clear legends.

Chapters devoted to the fields of bacteriology and pharmacology are very well done and will be of great value to general practitioners as well as endodontists. Included is an up-to-date review of the antibiotics and chemotherapeutic agents. In the chapter devoted to the roentgenographic diagnosis of periapical lesions, the authors clearly dispel a

misconception regarding the ability of the clinician to differentiate radicular cysts from dental granulomas by x-ray. The separation of these lesions by histologic examination is emphasized. This information is available because of the co-operation of the authors with a very able oral pathologist. The reader will find this chapter stimulating as well as illuminating.

This book is to be recommended to all general practitioners of dentistry, endodontists, and senior dental students.

—WILLIAM G. SPRAGUE, Capt., USAF (DC)

PERSONALITY, STRESS AND TUBERCULOSIS, edited by *Phineas J. Sparer*, M. D. 629 pages; illustrated. International Universities Press, Inc., New York, N. Y., 1956. Price $12.50.

This book brings together selected topics by authors well qualified to review current thought, practice, and research in the various fields related to tuberculosis. Chapters on the psychiatric, psychologic, and psychosomatic, as well as physicochemical and endocrine aspects of the disease are included. Considerable material of practical significance is discussed, including irregular discharges and rehabilitation. The many problems that arise in relation to the alcoholic tuberculous patient are well presented.

In a volume of this type there is of necessity considerable repetition of material, especially in those chapters discussing the personality, attitudes, and emotional reactions of tuberculous patients.

While there is little that is actually new in this volume for those who are working actively in the field and staying abreast of the current literature, it should serve as an excellent review of the interdisciplinary approach to the tuberculous patient. The book will also prove extremely valuable as a ready reference volume because of the comprehensive review of the literature.

One criticism might be that too little space is given to the problem of motivation in these patients. One wonders what the recovery rate might be if a sizeable monetary award were given for recovery. It is fairly well proven that service-connected cases tend to leave the hospital before recovery rather than lose their service-connected monetary disability benefits. The early monetary settlement of accident claims by insurance companies has certainly tended to definitely reduce chronic invalidism in many cases.

It continues to appear that we may well have been wrong in fostering regression in the active tuberculous patients. The old days of absolute bed rest may finally be replaced by physical activity within reason. This book is strongly recommended for all those who are interested in the successful treatment of the tuberculous patient.

—PHILLIP B. SMITH, Lt. Col., MC, USA

PREPARING FOR MOTHERHOOD, A Manual for Expectant Parents, by *Samuel R. Meaker,* M. D. 196 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1956. Price $2.

This manual for expectant parents presents stimulating and detailed helpful advice for every expectant mother from the time of conception through the puerperium. It is designed to educate the parents and create understanding and co-operation between them and their attending obstetrician.

Its 200 pages are written in an easily readable and personal style by Dr. Meaker who has thoughtfully presented information adaptable to, and supplementary to, any of the usual methods of prenatal and obstetrical management. He adequately covers all the information expectant parents need to know, including early and late signs of pregnancy expected, physical and psychologic changes, precautions and care during various stages of pregnancy, methods and reasons for psychologic preparation for labor and for various analgesics and anesthetics, the relief of common discomforts, and many other details.

Dr. Meaker has succeeded in giving us a welcome, complete, and pleasantly styled manual to supplement physicians' advice to their patients.—*DWIGHT A. CALLAGAN, Comdr., MC, USN*

ATLAS OF PLASTER CAST TECHNIQUES, by *E. E. Bleck,* M. D., *Nellie Duckworth,* and *Nancy Hunter.* 128 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1956. Price $4.75.

This manual is intended for the novice in plaster technics and the occasional user of plaster immobilization. It is presented in the form of a spiral binder and printed on heavy glossy paper. In addition to the discussion of extremity and body casts it contains chapters on plaster of paris, plaster room equipment, general technics, wedging casts, complications, removal of plaster casts, bibliography, index, and a concise appendix covering supplies, their sizes and sources.

The narrative part of the manual comprises less than 20 per cent of the space; the bulk of the material is presented in the form of a series of excellent step-by-step photographs accompanied by concise legends.

Technically the authors have well achieved what they set out to do: to be of help to internes, residents, plaster nurses, and plaster room orderlies.

The material discussed carries considerable authority, springing primarily from 32 years' experience at the North Carolina Orthopedic Hospital, where most of the basic ideas presented were developed. But beyond that, much that was developed and refined in the South is incorporated, such as the Hoke Well-Leg-Traction or Kites Wedging-Cast-Treatment for the congenital clubfoot.

Brevity and clarity of presentation enhance the definite value of this work.—*ERNST DEHNE, Lt. Col., MC, USA*

THE MERCK MANUAL of Diagnosis and Therapy, edited by *Charles E. Lyght*, M. D. 9th edition. 1,888 pages; 20 main sections, each thumb-indexed. Merck & Co., Inc., Rahway, N. J., 1956. Price $6.75.

As most medical students and house officers know, a great variety of information is readily available in this small, compact book. It is an immediate, on-the-spot guide, with reference to current literature and standard texts for more complete discussions. The manual provides up-to-date medical information in a convenient, concise, yet adequate form.

The format of the new edition is similar to that of the 1951 edition. Diagnosis and therapy are given primary emphasis, but pertinent physiologic, pathologic, and etiologic factors are included. Readily applicable advice on the treatment of medical emergencies, burns, poisoning, and shock greatly enhance its usefulness. In addition to several new chapters, many new illustrations, diagrams, and tables have been included.

A more complete and useful handbook covering such a wide variety of general medical subjects is not available in any book of this size.

—*FRANKLIN M. ROBERTS, Lt., MC, USNR*

HOMOSEXUALITY: Disease or Way of Life? By *Edmund Bergler*, M.D. 302 pages. Hill and Wang, Inc., New York, N.Y., 1956. Price $5.

The author contends that there are four factors which have made the problem of homosexuality more important for us today than it was 10 years ago. First, there has been some awakening to the seriousness of the problem, even though there is still great general ignorance on this subject. Second, there are many incipient homosexuals who have become confirmed homosexuals through the dissemination of inaccurate, false, and misleading information. Third, homosexuality is at the root of a new and increasing kind of marital tragedy, that in which a homosexual marries an unsuspecting mate. The most important of the four premises is that homosexuality is a psychiatric illness, coming into the area of treatment and cure. In this book, the four points indicated above are projected in the light of Dr. Bergler's vast psychoanalytic experience. There is much illustration and amplification of his view of the psychodynamics, psychopathology, and psychoanalytic treatment of both male and female homosexuals.

At times this reviewer felt that Dr. Bergler might better have written two books: one for lay consumption and one for professional readers. Much of the psychoanalytic material seems too complex, too repetitious, and too unrewarding for the lay reader, while there is some material which is old and somewhat boring for the psychiatrist.

This book is recommended to the medical profession and to the lay reader who requires more information on the subject.

—*ROBERT E. SWITZER, M. D.*

THE YEAR BOOK OF OBSTETRICS AND GYNECOLOGY (1956-1957 Year Book Series), edited by *J.P. Greenhill*, M.D., F.A.C.S., F.I.C.S. (Honorary). 592 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1956. Price $6.75.

This book merits nothing but high praise. It is in an easily readable style; the abstracts cover the domestic and foreign literature from July 1955 to July 1956, and give the essence of the original article effectively. The frequent editorial footnotes reflect a conservative approach to the problems in this field and also a great wealth of personal experience.

The Year Book can serve as "the bible" for the busy general practitioner as well as the residents and specialists in this field.

—HENRY J. HUNTER, Capt., MC, USN

GLAUCOMA, Transactions of the First Conference, December 5, 6, and 7, 1955, Princeton, N. J. Edited by *Frank W. Newell*, M. D. Sponsored by the Josiah Macy, Jr. Foundation, New York, N. Y. Josiah Macy, Jr. Foundation Publications, New York, N. Y., 1956. Price $4.50.

The goal of these conferences, as organized by the Josiah Macy, Jr. Foundation, is to bring together scientists for the promotion of communication and exchange of ideas on research dealing with some urgent problem in medicine and health. This book deals with the subject of glaucoma. The transactions are published in order to share the conference process with a larger audience than could participate personally.

The format of the book is excellent. It is divided into three sections, (1) a review of angle-closure glaucoma, (2) central control of intraocular pressure, and (3) physiologic and pharmacologic factors influencing the resistance to aqueous outflow. Each subject is introduced by an authority who acts as chairman for the discussion, and the dialogue is printed verbatim. The discussion may proceed along a single viewpoint, or it may veer off in a different direction as the influence of an allied scientist becomes evident. At the end of each section, there are voluminous references which are excellent source material for the researcher, teacher, and ophthalmologist. The first section will hold more interest for the practicing ophthalmologist than the others, particularly the discussion dealing with classifications, trigger mechanism, and inter-relationship of blood pressure and intra-ocular pressure.

The other two sections will hold more interest for the researcher and teacher in the field. It is believed that this style of conference technic will prove interesting and stimulate discussion. Some will object to their trend of thought being interrupted, and the discussors' inability to arrive at conclusions. A good deal of time and space is consumed in the explanation of research apparatus and technics.

The book is definitely applicable for the research and teaching ophthalmologist. While the average practicing ophthalmologist will not find its contents readily usable, he will find his interest and curiosity greatly aroused and his powers of observation and background knowledge enormously increased. *—AUBREY L. JENNINGS, Col., USAF (MC)*

SURGERY FOR GENERAL PRACTICE, by *Victor Richards,* M. D. 947 pages; 476 illustrations. The C. V. Mosby Co., St. Louis, Mo., 1956. Price $17.50.

This text on surgery encompasses almost the entire field of surgery, ranging from seemingly minor ailments to life-endangering catastrophies. The book is well written, readable, and is adequately illustrated with clean and simple black and white sketches and drawings. The author has written the major portions of the book, drawing on over 10 years' experience at the Stanford University Surgical Outpatient Clinics.

The majority of chapters are prefaced with clear and concise discussions on applicable anatomy, basic physiology, and/or general concepts of treatment. For each condition discussed the author usually mentions several of the presently accepted modes of treatment, dwelling at slightly greater length on one of these modes. Although this is not a book of operative technics, many so-called minor technics for office work are described in detail.

The author has done an admirable job, discussing present-day concepts of pathologic physiology, diagnosis, and treatment.

It is felt that this book will be valuable to physicians in general practice and will help them understand, evaluate, and treat surgical condition.— *CLINTON S. LYTER, Col., MC, USA*

PRESCRIPTION WRITING AND MATERIA MEDICA FOR DENTISTS, by *L. Richard Cipes,* Ph.G., D.D.S. 4th edition. 624 pages; illustrated. Dental Items of Interest Publishing Co., Inc., Brooklyn, N.Y., 1956. Price $9.50.

In revising the third edition, the author states that it is the responsibility of the conscientious dentist to acquaint himself with the new drugs and their administration for the relief of pain, control of infection, and treatment of other conditions affecting the state of health of the oral cavity and the individual.

In logical sequence, the author gives the prescription writing, the reasons for prescribing, the materia medica of dentistry, and the method of prescribing drugs.

The section on antibiotic therapy is an excellent reference, and the chapter on dental formulas gives much useful information. The author has included a very comprehensive section on prescription writing from which all dentists can benefit.

This book is well written in a clear, concise, and easily readable style. The type, paper, and binding are good. The illustrations, tables, and graphs are clear and pertinent. A short but adequate list of references is given.

This book should provide interesting and useful information to the dental student and practicing dentist and offers a good reference to dental materia medica. —*RICHARD J. BURCH, Col., USAF (DC)*

ADRENAL FUNCTION IN INFANTS AND CHILDREN, A Symposium, edited by *Lytt I. Gardner, M. D.* 221 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1956. Price $6.75.

This book is a complete transcription of a symposium held in Syracuse, N. Y., in November 1954. At this meeting an attempt was made to correlate what is known of adrenal function in infants and children. It succeeded beautifully. The subjects covered vary from those of academic and theoretic interest, such as the orgin of the ketosteroids and the nature of the enzymic deficiencies in the adrenogenital syndrome, to subjects of considerable clinical interest and importance, such as the surgical treatment of pseudohermaphroditism. Throughout all the various sections of the book one finds bits of information which are not available elsewhere and which are important to people working in the field; for instance, the difference in the pattern of excretion of 17-ketosteroids in premature and full-term infants. The book has been carefully edited with the important discussions being presented verbatim. These are of great interest for they illustrate the differences of opinion among the authorities in this field and the vast areas which remain to be investigated before the problem of adrenal function in children can be clearly understood. If the book has any deficiency, it lies not in the work of several authors or the editor but in the undeveloped state of our knowledge at the present time.

—*DANIEL STOWENS, Maj., MC, USA*

The Laboratory Diagnosis of COAGULATION DEFECTS, by *Pietro De Nicola,* M. D. A Monograph in The Bannerstone Division of American Lectures in Pharmacology, edited by *Chauncey D. Leake,* Ph. D. 240 pages; 62 illustrations and 26 tables. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $7.50.

The author of this volume, by virtue of his wide experience in the experimental and clinical field of coagulation defects, is well qualified to analyze and present the complex physiology and physiopathology of this field. The problem is a difficult one in that work in this field is continuing at a rapid pace. Dr. De Nicola has approached this problem by dividing his book into five parts: Physiologic background; description and interpretation of the general methodology; special diagnosis of coagulation defects; analytic description of the technics employed; and a summary. The first three sections are exceptionally well presented, and serve as an excellent reference manual for the study of the problems of hemostasis. The technical section suffers from the fact that the author is such an excellent technician himself, and his descriptions of the diagnostic tests presume that the reader has had some experience in this field. The neophyte might have some difficulty. The section does contain five excellent tables on equipment and reagents required for the 30 tests described. A selected bibliography is included. This volume is recommended to "coagulationists" and others who are faced with the problem of unraveling an occasional problem in hemostasis.—*JOSEPH H. AKEROYD, Lt. Col., MSC, USA*

WIRE BRUSH SURGERY, In the Treatment of Certain Cosmetic Defects and Diseases of the Skin, by *James W. Burks, Jr.*, M. S., M. D. American Lecture Series, Publication No. 300, A Monograph in the Bannerstone Division of American Lectures in Dermatology, edited by *Arthur C. Curtis*, M. D. 154 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $6.75.

It is intellectually stimulating to review a monograph such as this one, written in such an interesting and concise manner, on the well-advertised procedure of skin planing. The monograph presents, from a medical standpoint, the detailed facets of wire brush surgery from its history through future trends, including anatomy, histopathology, psychology, equipment, anesthesia, and technic. It will prove to be of interest to physicians with experience in the procedure and of an absolute necessity to students and other physicians thinking of initiating this procedure in their clinics or practices.

The two purposes of this monograph—to summarize the experience of the pioneers in abrasive surgery and to present the author's personal experience in over 750 planings—have been accomplished. The author's attempt to apply academic knowledge of the basic sciences to the clinical procedure has also substantially succeeded.

Certain differences of opinion are bound to arise among physicians experienced in this procedure. The author himself was not too clear about whether to bandage or not to bandage. In the chapter, "Psychological Aspects of Planing," the use of bandages is recommended in certain instances and for certain periods as is the use of an antibiotic ointment. However, in the chapter on "Postoperative Care" bandaging is not recommended, which is, I believe, in agreement with other experienced operators. The author also presents the belief that a fundamental psychologic change can be expected as a result of planing. In my experience a superficial psychologic change has proved to be the rule.

In one chapter, lesions other than scars are discussed. Some of these include nevi, epitheliomas, and lupus erythematosus. This portion of the book is particularly suited to dermatologists and others with long experience in the diagnosis of skin lesions. I believe it should be emphasized that the results of planing epitheliomas in the author's hands may be entirely different than in those treated by relatively inexperienced operators. Positive diagnosis of all cases of nevi, tumors, and other conditions should be made prior to any decision concerning treatment.

The black and white photographs are excellent; all procedures are well illustrated. This monograph is a primer for all interested in the technic of skin planing.—*ROBERT E. LYONS, Col., USAF (MC)*

"CONTROLLED HYPOTENSION" IN ANESTHESIA AND SURGERY, by *David M. Little*, Jr., M. D. A Monograph in The Bannerstone Division of American Lectures in Anesthesiology, edited by *John Adriani*, M. D. 159 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $4.50.

With the present-day trend toward wide variations in the practice of anesthesiology and the attempts to alter patients' normal physiologic responses by drugs and technics so as to provide apparently better surgical fields, it is wise to step back occasionally and review our actions. That is the aim and accomplished purpose of this monograph. Dr. Little has first presented the problem, which is blood loss during operation, with a brief discussion of some of the major causes. This is followed by a discussion of the control of bleeding. He outlines several methods of control by the production of hypotension.

Because deliberately produced hypotension is very recent in the practice of anesthesia and surgery, few physicians have extensive experience in this technic. The comprehensive review of the literature, therefore, is sufficient of itself to make this monograph worthwhile. The medical reports are co-ordinated with the practical application of the principles. The chapter discussing the side effects on the vital organs and those chapters presenting the indications, contraindications, and complications have concise conclusions and leave no doubt as to the author's opinions concerning the use of hypotensive technics.

The reviewer believes that this monograph should be included in the reference library of all physicians who are directly concerned with the care of those patients who seem to require hypotension for the accomplishment of necessary surgical procedures. Since rational and conservative use is advocated, the reviewer also believes that definite patient benefit may be obtained by using the monograph as a guide in such practice.—*HOWARD K. PEDIGO, Lt. Col., MC, USA*

DIAGNOSTIC METHODS IN VETERINARY MEDICINE, by *George F. Boddie*, B. Sc. (Edin.), M.R.C.V.S., F.R.S.E. 4th edition. 412 pages; illustrated. J.B. Lippincott Co., Philadelphia, Pa., 1956. Price $6.50.

The author, Professor of Veterinary Medicine at Edinburgh University, Scotland, has directed this book toward the veterinary student; however, it does contain much of interest to the practicing veterinarian. In the first part of the book, clinical diagnostic methods are considered in connection with each system of the body, but the subject matter is treated with such generality and brevity that it loses interest. Each of these chapters is introduced by a very brief discussion of the regional anatomy, but unfortunately the influence of differences in anatomy upon diagnostic methods is seldom clearly stated.

Beginning with chapter 13 and continuing through the sections on clinical biochemistry and clinical hematology, the approach to the subject is more direct and informative. The drawings taken from x-ray

films are rather simplified diagrams which bear so little resemblance to actual roentgenograms that they have limited instructional value. The anatomic drawings are useful for orientation but contain little detail. The drawings of smears of various bacteria in color, on the other hand, are attractive and informative. The print is readable and the text contains very few typographical errors.

This book will undoubtably be of value to the veterinary student who is being introduced to diagnostic methods. He may also find it useful as a reference book after graduation.

—THOMAS C. JONES, Lt. Col., VC, USA

VIRUS DISEASES AND THE CARDIOVASCULAR SYSTEM, A Survey, by *Ernest Lyon*, M. D. 215 pages. Grune & Stratton, Inc., New York, N. Y., 1956. Price $5.75.

In this scholarly book the author has admirably provided a comprehensive survey on the virus diseases and their cardiovascular manifestations. The book is well arranged. A fine foundation is provided by a chapter on viruses in general and associated cardiovascular involvement and a chapter on present cardiovascular concepts of virus diseases. The known viral diseases plus diseases of uncertain but possible viral etiology are developed in detail. Rickettsial infections are discussed with special reference to the cardiovascular system.

The book reflects the tremendous experience of the author who is to be congratulated on his adept manner in which he presents an exhaustive amount of material, weaving in his experience and interpretation so that the wealth of reference data flows smoothly and with purpose.

Throughout this volume one is impressed with the basic importance of the capillary syndrome with resulting hypovolemia and its effect on the whole body. The importance of treatment with plasma expanders is stressed. The possibility of cardiac catastrophes as well as prolonged debility and convalescence in some of the viral diseases becomes apparent.

This book is not only valuable for its elucidation on cardiovascular manifestations but also for the fine review of the basic pathology and pertinent clinical data on virus diseases in general and their effect on the human being. It will be of interest to all who work in the field of virology and to internists, and is a "must" for the cardiologist. Any reader will find a tremendous reward for his time and will gain a vast store of useful knowledge. An extensive bibliography follows each chapter, adding much to its value for reference material.

—RICHARD I. CRONE, Col., MC, USA

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

BRITISH MEDICAL BULLETIN, Volume 13, Number 1, January 1957, "Physiology and Pathology of the Kidney." 74 pages; illustrated. Published by the Medical Dept., The British Council, London W1, England. Distributed by Oxford University Press, New York, N. Y., January 1957. Price $3.25.

TEXTBOOK OF COLLEGE HYGIENE, by *Oliver E. Byrd,* Ed. D., M. D. 2d edition. 496 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957.

PRACTICAL PHYSICS FOR NURSES, by *George I. Sackheim,* S. M., A. M. 206 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957.

CURRENT THERAPY 1957, Latest Approved Methods of Treatment for the Practicing Physician, edited by *Howard F. Conn,* M. D., and 12 consulting editors. 731 pages. W. B. Saunders Co., Philadelphia, Pa. 1957.

CLINICAL ORTHOPAEDICS, No. 8, "Chronic Hereditary Diseases and Developmental Anomalies." *Anthony F. DePalma,* Editor-in-Chief. 337 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1956. Price $7.50.

PSYCHOLOGY OF HUMAN BEHAVIOR FOR NURSES, by *Lorraine Bradt Dennis,* B. S., R. N., M. S. 250 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957.

MEDICAL STATISTICS OF THE UNITED STATES ARMY, Annual Report of the Surgeon General, Calendar Year 1954. 344 pages. Will be furnished at no charge upon request to Chief, Medical Statistics Division, Office of the Surgeon General, Department of the Army, Washington 25, D. C.

CORONARY HEART DISEASE, Angina Pectoris, Myocardial Infarction, by *Milton Plotz,* M. D., F. A. C. P. Foreword by *William Dock,* M. D. 353 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $12.

POSITIONING IN RADIOGRAPHY, by *K. C. Clark,* M. B. E., F. S. R. 655 pages; 2,150 illustrations. 7th edition. Grune & Stratton, Inc., New York, N. Y., 1956. Price $29.

FUNDAMENTALS OF CLINICAL NEUROPHYSIOLOGY, by *Paul O. Chatfield,* M. D. 392 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $8.50.

The Clinical Management of VARICOSE VEINS, by *David Woolfolk Barrow,* M. D., with a Foreword by *Arthur W. Allen,* M. D. 2d edition, revised and enlarged. 169 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $6.

PRACTICAL PSYCHIATRY FOR INDUSTRIAL PHYSICIANS, by *W. Donald Ross,* M. D., B. Sc. (Med.), F. R. C. P. (C). Foreword by *Robert A. Kehoe,* B. S., M. D. Preface by *Maurice Levine,* A. M., M. D. 401 pages. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $7.50.

HANDBOOK ON POLIOMYELITIS, by *Joseph Trueta,* M. D., D. Sc. (Hon.) (Oxon.), F. R. C. S. (Hon.) (Canada), F. R. C. S., A. B.; *Kinnier Wilson,* M. A., M. B., M. R. C. P., D. P. M.; and *Margaret Agerholm,* M. A., B. M., B. Ch. (Oxon.). 139 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $3.75.

Principles and Technics of REHABILITATION NURSING, by *Florence Jones Terry,* B. A., R. N., P. T., O. T. R.; *Gladys S. Benz,* R. N., M. A.; *Dorothy Mereness,* R. N., M. A.; *Frank R. Kleffner,* Ph. D.; and *Deborah MacLurg Jensen,* R. N., M. A. (Editor). 345 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., 1957. Price $5.50.

ULTRAMICRO METHODS FOR CLINICAL LABORATORIES, by *Edwin M. Knights, Jr.,* M. D.; *Roderick P. MacDonald,* Ph. D.; and *Jaan Ploompuu.* 128 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1957. Price $4.75.

STRESS AND STRAIN IN BONES, Their Relation to Fractures and Osteogenesis, by *F. Gaynor Evans,* Ph. D. American Lecture Series, Publication No. 296, The Bannerstone Division of American Lectures in Medical Physics, edited by *Otto Glasser,* Ph. D. 245 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $6.50.

PRACTICAL OFFICE GYNECOLOGY, by *Albert Decker,* M. D., D. O. G., F. A. C. S., and *Wayne H. Decker,* M. D., D. O. G. A Series of Monographs, Obstetrics & Gynecology, edited by *Claude E. Heaton,* M. D. 388 pages; 103 illustrations, 19 in color. F. A. Davis Co., Philadelphia, Pa., 1956. Price $10.50.

BASIC FOUNDATIONS OF ISOTOPE TECHNIQUE For Technicians, edited by *Willard C. Smullen,* M. D., F. A. C. R. 163 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $4.75.

PRACTICAL DERMATOLOGY, by *Samuel M. Peck,* B. S., M. D., with *Laurence L. Palitz,* M. D., Ph. D. 380 pages; illustrated. Landsberger Medical Books, Inc. Distributed by The Blakiston Division, The McGraw-Hill Book Co., Inc., New York, N. Y., 1956. Price $7.

VOCATIONAL COUNSELING WITH THE PHYSICALLY HANDICAPPED, by *Lloyd H. Lofquist.* 384 pages. Appleton-Century-Crofts, Inc., New York, N. Y., 1957. Price $5.

SYNOPSIS OF PATHOLOGY, by *W. A. D. Anderson,* M. A., M. D., F. A. C. P., F. C. A. P. 4th edition. 829 pages; 328 text illustrations and 12 color plates. The C. V. Mosby Co., St. Louis, Mo., 1957. Price $8.75.

THE YEAR BOOK OF DRUG THERAPY (1956-1957 Year Book Series), edited by *Harry Beckman,* M. D. 514 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $6.75.

MODERN OFFICE GYNECOLOGY, by *George Blinick,* M. D., F. A. C. S., and *Sherwin A. Kaufman,* M. D., F. A. C. S. 218 pages; 47 illustrations. Lea & Febiger, Philadelphia, Pa., 1957. Price $4.50.

THE GIST OF OBSTETRICS, by *H. B. Atlee,* M. D., F. R. C. S. (Ed & Can.), F. I. C. S. Illustrated by *Garth Vaughan,* M. D., C. M. (Dal). 327 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $6.

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